OMB No. 1124-0002; Expires May 31, 2020

U.S. Department of Justice

Washington, DC 20530

Supplemental Statement Pursuant to the Foreign Agents Registration Act of 1938, as amended

For Six Month Period Ending 10/31/2019
(Insert date)

I - REGISTRANT

1. (a) Name of Registrant

Florence Lowe-Lee

(b) Registration No.

6067

(c) Business Address(es) of Registrant

1001 Connecticut Avenue, NW
Suite 435
Washington, DC 20036

2. Has there been a change in the information previously furnished in connection with the following?

(a) If an individual:

(1) Residence address(es)	Yes ☐	No ☒
(2) Citizenship	Yes ☐	No ☒
(3) Occupation	Yes ☐	No ☒

(b) If an organization:

(1) Name	Yes ☐	No ☐
(2) Ownership or control	Yes ☐	No ☐
(3) Branch offices	Yes ☐	No ☐

(c) Explain fully all changes, if any, indicated in Items (a) and (b) above.

IF THE REGISTRANT IS AN INDIVIDUAL, OMIT RESPONSE TO ITEMS 3, 4, AND 5(a).

3. If you have previously filed Exhibit C[1], state whether any changes therein have occurred during this 6 month reporting period.

Yes ☐ No ☒

If yes, have you filed an amendment to the Exhibit C? Yes ☐ No ☐

If no, please attach the required amendment.

1 The Exhibit C, for which no printed form is provided, consists of a true copy of the charter, articles of incorporation, association, and by laws of a registrant that is an organization. (A waiver of the requirement to file an Exhibit C may be obtained for good cause upon written application to the Assistant Attorney General, National Security Division, U.S. Department of Justice, Washington, DC 20530.)

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

4. (a) Have any persons ceased acting as partners, officers, directors or similar officials of the registrant during this 6 month reporting period?

Yes ☐ No ☒

If yes, furnish the following information:

Name	Position	Date Connection Ended

(b) Have any persons become partners, officers, directors or similar officials during this 6 month reporting period?

Yes ☐ No ☒

If yes, furnish the following information:

Name	Residence Address	Citizenship	Position	Date Assumed

5. (a) Has any person named in Item 4(b) rendered services directly in furtherance of the interests of any foreign principal?

Yes ☐ No ☒

If yes, identify each such person and describe the service rendered.

(b) During this six month reporting period, has the registrant hired as employees or in any other capacity, any persons who rendered or will render services to the registrant directly in furtherance of the interests of any foreign principal(s) in other than a clerical or secretarial, or in a related or similar capacity? Yes ☐ No ☒

Name	Residence Address	Citizenship	Position	Date Assumed

(c) Have any employees or individuals, who have filed a short form registration statement, terminated their employment or connection with the registrant during this 6 month reporting period? Yes ☐ No ☒

If yes, furnish the following information:

Name	Position or Connection	Date Terminated

(d) Have any employees or individuals, who have filed a short form registration statement, terminated their connection with any foreign principal during this 6 month reporting period? Yes ☐ No ☒

If yes, furnish the following information:

Name	Position or Connection	Foreign Principal	Date Terminated

6. Have short form registration statements been filed by all of the persons named in Items 5(a) and 5(b) of the supplemental statement?

Yes ☒ No ☐

If no, list names of persons who have not filed the required statement.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

II - FOREIGN PRINCIPAL

7. Has your connection with any foreign principal ended during this 6 month reporting period? Yes ☐ No ☒
If yes, furnish the following information:

Foreign Principal	Date of Termination

8. Have you acquired any new foreign principal(s)[2] during this 6 month reporting period? Yes ☐ No ☒
If yes, furnish th following information:

Name and Address of Foreign Principal(s)	Date Acquired

9. In addition to those named in Items 7 and 8, if any, list foreign principal(s)[2] whom you continued to represent during the 6 month reporting period.

Korea Atomic Energy Research Institute (KAERI)

10. (a) Have you filed exhibits for the newly acquired foreign principal(s), if any, listed in Item 8?
Exhibit A[3] Yes ☐ No ☐
Exhibit B[4] Yes ☐ No ☐
If no, please attach the required exhibit.

(b) Have there been any changes in the Exhibits A and B previously filed for any foreign principal whom you represented during this six month period? Yes ☐ No ☐
If yes, have you filed an amendment to these exhibits? Yes ☐ No ☐
If no, please attach the required amendment.

2 The term "foreign principal" includes, in addition to those defined in Section 1(b) of the Act, an individual organization any of whose activities are directly or indirectly supervised, directed, controlled, financed, or subsidized in whole or in major part by a foreign government, foreign political party, foreign organization or foreign individual. (See Rule 100(a) (9)). A registrant who represents more than one foreign principal is required to list in the statements he files under the Act only those principals for whom he is not entitled to claim exemption under Section 3 of the Act. (See Rule 208.)

3 The Exhibit A, which is filed on Form NSD-3, sets forth the information required to be disclosed concerning each foreign principal.

4 The Exhibit B, which is filed on Form NSD-4, sets forth the information concerning the agreement or understanding between the registrant and the foreign principal.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

III - ACTIVITIES

11. During this 6 month reporting period, have you engaged in any activities for or rendered any services to any foreign principal named in Items 7, 8, or 9 of this statement? Yes ☒ No ☐

If yes, identify each foreign principal and describe in full detail your activities and services:

Korea Atomic Energy Research Institute (KAERI)

12. During this 6 month reporting period, have you on behalf of any foreign principal engaged in political activity[5] as defined below? Yes ☐ No ☒

If yes, identify each such foreign principal and describe in full detail all such political activity, indicating, among other things, the relations, interests and policies sought to be influenced and the means employed to achieve this purpose. If the registrant arranged, sponsored or delivered speeches, lectures or radio and TV broadcasts, give details as to dates, places of delivery, names of speakers and subject matter.

13. In addition to the above described activities, if any, have you engaged in activity on your own behalf which benefits your foreign principal(s)? Yes ☐ No ☒

If yes, describe fully.

5 "Political activity," as defined in Section 1(o) of the Act, means any activity that the person engaging in believes will, or that the person intends to, in any way influence any agency or official of the Government of the United States or any section of the public within the United States with reference to formulating, adopting or changing the domestic or foreign policies of the United States or with reference to political or public interests, policies, or relations of a government of a foreign country or a foreign political party.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

IV - FINANCIAL INFORMATION

14. (a) **RECEIPTS-MONIES**

During this 6 month reporting period, have you received from any foreign principal named in Items 7, 8, or 9 of this statement, or from any other source, for or in the interests of any such foreign principal, any contributions, income or money either as compensation or otherwise? Yes ☒ No ☐

If no, explain why.

If yes, set forth below in the required detail and separately for each foreign principal an account of such monies.[6]

Date	From Whom	Purpose	Amount
7/10/2019	KAERI	Per Contract	$60,000

$60,000
Total

(b) **RECEIPTS - FUNDRAISING CAMPAIGN**

During this 6 month reporting period, have you received, as part of a fundraising campaign[7], any money on behalf of any foreign principal named in Items 7, 8, or 9 of this statement? Yes ☐ No ☒

If yes, have you filed an Exhibit D[8] to your registration? Yes ☐ No ☐

If yes, indicate the date the Exhibit D was filed. Date _____

(c) **RECEIPTS-THINGS OF VALUE**

During this 6 month reporting period, have you received any thing of value[9] other than money from any foreign principal named in Items 7, 8, or 9 of this statement, or from any other source, for or in the interests of any such foreign principal?

Yes ☐ No ☒

If yes, furnish the following information:

Foreign Principal	Date Received	Thing of Value	Purpose

6, 7 A registrant is required to file an Exhibit D if he collects or receives contributions, loans, moneys, or other things of value for a foreign principal, as part of a fundraising campaign. (See Rule 201(e)).

8 An Exhibit D, for which no printed form is provided, sets forth an account of money collected or received as a result of a fundraising campaign and transmitted for a foreign principal.

9 Things of value include but are not limited to gifts, interest free loans, expense free travel, favored stock purchases, exclusive rights, favored treatment over competitors, "kickbacks," and the like.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

15. (a) **DISBURSEMENTS-MONIES**

During this 6 month reporting period, have you

(1) disbursed or expended monies in connection with activity on behalf of any foreign principal named in Items 7, 8, or 9 of this statement? Yes ☒ No ☐

(2) transmitted monies to any such foreign principal? Yes ☐ No ☐

If no, explain in full detail why there were no disbursements made on behalf of any foreign principal.

If yes, set forth below in the required detail and separately for each foreign principal an account of such monies, including monies transmitted, if any, to each foreign principal.

Date	To Whom	Purpose	Amount
See Attachment			

Total

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

(b) **DISBURSEMENTS-THINGS OF VALUE**

During this 6 month reporting period, have you disposed of anything of value[10] other than money in furtherance of or in connection with activities on behalf of any foreign principal named in Items 7, 8, or 9 of this statement?

Yes ☐ No ☒

If yes, furnish the following information:

Date	Recipient	Foreign Principal	Thing of Value	Purpose

(c) **DISBURSEMENTS-POLITICAL CONTRIBUTIONS**

During this 6 month reporting period, have you from your own funds and on your own behalf either directly or through any other person, made any contributions of money or other things of value[11] in connection with an election to any political office, or in connection with any primary election, convention, or caucus held to select candidates for political office?

Yes ☐ No ☒

If yes, furnish the following information:

Date	Amount or Thing of Value	Political Organization or Candidate	Location of Event

10, 11 Things of value include but are not limited to gifts, interest free loans, expense free travel, favored stock purchases, exclusive rights, favored treatment over competitors, "kickbacks," and the like.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

V - INFORMATIONAL MATERIALS

16. (a) During this 6 month reporting period, did you prepare, disseminate or cause to be disseminated any informational materials?[12]
Yes ☐ No ☒

If Yes, go to Item 17.

(b) If you answered No to Item 16(a), do you disseminate any material in connection with your registration?
Yes ☐ No ☐

If Yes, please forward the materials disseminated during the six month period to the Registration Unit for review.

17. Identify each such foreign principal.

18. During this 6 month reporting period, has any foreign principal established a budget or allocated a specified sum of money to finance your activities in preparing or disseminating informational materials? Yes ☐ No ☒

If yes, identify each such foreign principal, specify amount, and indicate for what period of time.

19. During this 6 month reporting period, did your activities in preparing, disseminating or causing the dissemination of informational materials include the use of any of the following:

☐ Radio or TV broadcasts ☐ Magazine or newspaper ☐ Motion picture films ☐ Letters or telegrams
☐ Advertising campaigns ☐ Press releases ☐ Pamphlets or other publications ☐ Lectures or speeches
☐ Other *(specify)* _____

Electronic Communications

☐ Email
☐ Website URL(s): _____
☐ Social media websites URL(s): _____
☐ Other *(specify)* _____

20. During this 6 month reporting period, did you disseminate or cause to be disseminated informational materials among any of the following groups:

☐ Public officials ☐ Newspapers ☐ Libraries
☐ Legislators ☐ Editors ☐ Educational institutions
☐ Government agencies ☐ Civic groups or associations ☐ Nationality groups
☐ Other *(specify)* _____

21. What language was used in the informational materials:

☐ English ☐ Other *(specify)* _____

22. Did you file with the Registration Unit, U.S. Department of Justice a copy of each item of such informational materials disseminated or caused to be disseminated during this 6 month reporting period? Yes ☐ No ☐

23. Did you label each item of such informational materials with the statement required by Section 4(b) of the Act?
Yes ☐ No ☐

12 The term informational materials includes any oral, visual, graphic, written, or pictorial information or matter of any kind, including that published by means of advertising, books, periodicals, newspapers, lectures, broadcasts, motion pictures, or any means or instrumentality of interstate or foreign commerce or otherwise. Informational materials disseminated by an agent of a foreign principal as part of an activity in itself exempt from registration, or an activity which by itself would not require registration, need not be filed pursuant to Section 4(b) of the Act.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

VI - EXECUTION

In accordance with 28 U.S.C. § 1746, the undersigned swear(s) or affirm(s) under penalty of perjury that he/she has (they have) read the information set forth in this registration statement and the attached exhibits and that he/she is (they are) familiar with the contents thereof and that such contents are in their entirety true and accurate to the best of his/her (their) knowledge and belief, except that the undersigned make(s) no representation as to truth or accuracy of the information contained in the attached Short Form Registration Statement(s), if any, insofar as such information is not within his/her (their) personal knowledge.

(Date of signature)	(Print or type name under each signature or provide electronic signature[13])
December 27, 2019	Sign /s/ Florence Lowe-Lee eSigned

13 This statement shall be signed by the individual agent, if the registrant is an individual, or by a majority of those partners, officers, directors or persons performing similar functions, if the registrant is an organization, except that the organization can, by power of attorney, authorize one or more individuals to execute this statement on its behalf.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Global America Business Institute
Profit & Loss
May through October 2019

	May - Oct 19
Income	
40000 · Revenues	
40100 · Research Revenue	60,000.00
Total 40000 · Revenues	60,000.00
Total Income	60,000.00
Expense	
50000 · Program Expenses	
50100 · Subject Matter Expert Fees	1,025.00
50150 · Honoraria	1,000.00
50200 · Conference/Seminar Expenses	3,077.21
51100 · Travel & Transportation Expense	309.00
52100 · Program Venue Rental Fees	8,199.88
Total 50000 · Program Expenses	13,611.09
60000 · Salaries & Contracted Services	
65300 · Subcontracted Research Fees	2,000.00
66000 · Accounting & Payroll Services	343.22
Total 60000 · Salaries & Contracted Services	2,343.22
70000 · Administrative Expenses	
70100 · Office Rent	67,837.97
76100 · Office Supplies	150.00
77000 · State/Federal Taxes	683.00
Total 70000 · Administrative Expenses	68,670.97
Total Expense	84,625.28
Net Income	**-24,625.28**

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Florence Lowe-Lee

President

Supplemental Period: 5/1/2018--10/31/2019

B=Breakfast; **L**=lunch; **D**=Dinner; **M**=Meeting; **C**=Conference; **R**=Reception; **P**=Program

MAY, 2018

2 M = Yongsoo Hwang, KAERI

3 L = Paul Murphy, Murphy Energy and Infrastructure Consulting, LLC

7 C = Hudson Institute "Future of Nuclear Security & Nonproliferation"

C = Korea Economic Institute "Does Kim Jung-eun have political space to denuclearize"

8 L = Sang-hyun Lee, Korea Nuclear Policy Society

15 C = Carnegie Endowment for International Peace "US-ROK Cooperation in Korean Unification"

23 L = Andy Oh, Korea Hydro & Nuclear Power (KHNP)

31 M = Michael Hewitt, IP3

JUNE, 2018

5 P = GABI "Nuclear Policy and Politics on the Korean Peninsula"

6 L = Hyeon-sook Cho, Science Attaché, Korean Embassy

10 M = Andrei Afanasev, The George Washington University

12 P = GABI "Prospects for SMR and Advanced Reactor Deployment in Sub-Saharan Africa"

19 C = Nuclear Threat Initiative "Corporate Threat Reduction" report release

24 C = CSIS "US-ROK Strategic Forum"

26 C = US-Japan Nuclear Energy Research

27 P = GABI "GABI-FNS Capitol Hill Briefing – Integrated Hybrid Energy Systems: Nuclear-Renewable-Thermal Synergies"

JULY 2018

10 L = Dong-hun Lee, KAERI

11 L = Lee Terry, Kelley, Dreyer & Warren, LLP

17 C = Nuclear Infrastructure Council "Nuclear Capital"

18 M = Kwang-seok Lee, KAERI

25 D = Foundation for Nuclear Studies (FNS) Salon Dinner with Congresswoman Chrissy Houlahan

26 L = Chan Pak, Centrus Energy Corporation

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

AUGUST 2018

2 C = Center for Nonproliferation Studies (CNS) "Whiter a Middle East WMD"

7 M = Mike Bloomberg, IP3

12 L = Tim Frazier, GE-Hitachi Nuclear Energy

26-29 P = GABI "Multilateral Nuclear Energy Dialogue – Developing an Institutional Framework for Expanded Global SMR and Advanced Reactor Deployments"

SEPTEMBER 2018

10 D = FNS Salon Dinner with Congresswoman Xochitl Torres Small

12 P = GABI "Nuclear Energy Programs and Research at Advanced Research Projects Agency-Energy (ARPA-E)"

17 L = Hyun-sook Choi, Science Attaché, Korean Embassy

30 L = Helen Milby &Alyssa O'Rourke, FNS

OCTOBER 2018

3 M = Don Wolf & James Wolf, Advanced Reactor Concept (ARC)

8 C = Wilson Center, "Nuclear Crisis with North Korea"

11 M = Seth Grae, Lightbridge Corporation

15 C = Atlantic Council, "Nuclear Europe & National Security Coalition"

18 L = Jungsoo Hur, Commercial Section, Korean Embassy

23-26 C = Korea Nuclear Society Annual Meeting

28-30 C = Korea Nuclear International Cooperation Foundation (KONICOF) Job Fair

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Global America Business Institute Activities

Period from 5/1/2019-10/31/2019

5/29/2019 – *"Nuclear Policy and Politics on the Korean Peninsula: Current Development and Trends"*

Speaker: Dr. Sang Hyun Lee (Senior Research Fellow, Sejong Institute in Korea; President, Korean Nuclear Policy Society)

Abstract: Although the Moon administration initially announced a long-term phase out of nuclear energy, in reality, the government appears to be instead working towards reducing the proportion of nuclear in the national energy mix and continues to support exports of the country's civil nuclear technology. South Korea's civil nuclear capabilities can also prove critical to its efforts to achieve peace and denuclearization on the Korean Peninsula, the future of which faces uncertainties given differing expectations and assumptions regarding denuclearization. Nuclear developments on the Korean Peninsula thus have outsized impact—the factors that affect South Korea's emergence as an international nuclear supplier and resolution of North Korea's nuclear standoff with the international community will have worldwide effects on issues such as regional and global geopolitics, energy poverty, carbon mitigation, nuclear nonproliferation and security regimes, etc.

Objectives:

6/5/2019 – "Prospects for SMR and Advanced Reactor Deployment in Sub-Saharan Africa"

Speakers: Ms. Jessica Lovering (Director of Energy, Breakthrough Institute)

Abstract: There has been widespread interest in the development of civil nuclear programs in Africa. Africa, and Sub-Saharan Africa in particular, has never been viewed as a robust market for nuclear power, at least partly because conventional plants are perceived as too costly and inflexible to be practical. However, with the emergence of SMRs and advanced reactors, nuclear is increasingly being considered as a feasible option to address regional energy needs. Certain advanced nuclear designs are particularly suited to meet Africa's unique energy, water, and industrial needs. High-temperature gas-cooled reactors (HTGRs) can supply high temperatures for both industrial and desalination processes. Moreover, HTGRs do not require co-location with bodies of water for cooling, allowing for versatile siting. Smaller reactor designs are also cheaper in absolute terms and can be deployed in off-grid areas or regions with limited grid infrastructure. At present, Russia and China appear to have an advantage in the emerging African civil nuclear market. Nevertheless, technological advancements, new business models, and international cooperation may accelerate the deployment of nuclear energy in Africa and assist with competing against Russian and Chinese vendors.

Objectives:

6/12/2019 – "Russian and Chinese Approaches to Civil Nuclear Exports: Responding to the Competitive Landscape and Implications for U.S. Foreign Policy"

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Speaker: Mr. Paul Murphy (Managing Director, Murphy Energy & Infrastructure Consulting LLC); Dr. Paul Sullivan (Professor of Economics, National Defense University; Adjunct Professor of Security Studies, Georgetown University); Mr. Kenneth Luongo (President, Partnership for Global Security)

Abstract: Russia and China are quickly and aggressively marketing their civil nuclear technologies throughout the world. For emerging nuclear markets, such as in the Middle East and Sub-Saharan Africa, the comprehensive nature of Russian and Chinese civil nuclear packages—which includes financing, equity, operations, training, long-term support, fuel cycle services, and other side benefits—is very appealing. The Russian and Chinese governments have also made nuclear energy exports a strategic priority in order to achieve geopolitical objectives in key regions and countries. As it stands, the U.S. nuclear industry is not well poised to compete with Russian and Chinese nuclear suppliers. However, through robust support for nuclear energy innovation in small modular reactors and advanced reactors, coordination and cooperation between the public and private sectors, and cultivation of prudent international partnerships, the U.S. may be able to improve its competitive position vis-à-vis Russian and Chinese nuclear state-owned enterprises.

6/27/2019 – "Integrated Hybrid Energy Systems: Nuclear-Renewable-Thermal Synergies"

Speakers: Dr. Douglas Arent (Deputy Associate Lab Director for Scientific Computing and Energy Analysis, National Renewable Energy Laboratory); Dr. Shannon Bragg-Sitton (Co-Director, Nuclear Science and Technology Lead, Idaho National Laboratory); Dr. Thomas Tarka (Senior Engineer, Systems and Engineering Analysis Directorate, National Energy Technology Laboratory); Mr. Todd Hurrle (Fleet Engineering Director, Xcel Energy)

Abstract: Increasing penetrations of ever affordable renewable energy, while helpful in mitigating carbon and other atmospheric emissions, are effecting growing challenges related to grid management, power reliability, and dispatchability. With recent advances in control and communications networks, reactor designs, and carbon capture, the integration of various low-carbon energy generation technologies has the potential to concurrently achieve a broad suite of desirable outcomes: reduced emissions and environmental impact, energy system reliability and resilience, electric grid stability, decarbonization of the transportation and industrial sectors, resource optimization, etc. Currently, a number of U.S. national laboratories are co-investigating integrated hybrid energy systems, combining the best characteristics of available energy technologies in order to realize a more affordable, environmentally friendly, reliable, and resilient energy system for both electricity and industrial heat processes.

9/12/2019 – "Nuclear Energy Programs and Research at Advanced Research Projects Agency-Energy"

Speakers: Dr. Rachel Slaybaugh (Program Director, Advanced Research Projects Agency-Energy; Assistant Professor, University of California Berkeley)

Abstract: Advanced Research Projects Agency-Energy (ARPA-E) has added nuclear energy technologies to their portfolio of projects to support the broader mission of ensuring the U.S. technological lead in energy and bolstering U.S. economic and energy security. One of the major

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

challenge areas for the nuclear industry is in operation and maintenance (O&M), as this represents a much greater proportion of the cost of nuclear power generation than other generation sources, including natural gas and renewables. Reducing construction cost of nuclear units will also be critical to improving the economic competitiveness of nuclear versus other energy sources. ARPA-E is hoping to address such issues through facilitating technological innovations affecting the cost competitiveness and viability of nuclear power, especially future SMR and advanced reactor designs. Areas on which ARPA-E is focusing in the nuclear area include: advanced construction materials, load following capabilities, incorporation of additive manufacturing technologies, automation and artificial intelligence, advanced modeling and simulation, etc.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

MULTILATERAL NUCLEAR ENERGY DIALOGUE

Developing an Institutional Framework for Expanded Global SMR and Advanced Reactor Deployment

Henderson, Nevada
August 26-29. 2019

Forming a Coalition of the Willing

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Table of Contents

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

WELCOMING LETTER

Dear Esteemed Colleagues,

It is my great honor and privilege to welcome you to the Multilateral Nuclear Energy Dialogue: Forming a Coalition of the Willing in Nevada.

The Global America Business Institute (GABI) has hosted a series of trilateral (Korea-Japan-United States) meetings over the past several years. These meetings generally focused on issues concerning back-end fuel cycle management and opportunities for international cooperation in this area. Although a coordinated strategy towards dealing with spent nuclear fuel and radioactive waste remains critically important, the pressing international challenges of the present necessitated that we expand the scope and purview of this unique forum.

We are pleased to host for the first time representatives from Canada to this meeting. The U.S., Korea, Japan, and Canada are likely to be among the pioneers of the advanced nuclear renaissance—constructing reactors that are smaller, safer, more economical, more sustainable, and more flexibly deployed. Considering projected energy demand growth in the Developing World and the urgent need to mitigate carbon and other atmospheric emissions, advanced nuclear technologies are an ideal platform through which to tackle both global issues. The ultimate challenge will be to expand access to these technologies, while also ensuring high standards of safety and security in their deployment. Achieving this goal will require both high degrees of ingenuity and coordination.

Thank you for your participation in this program. In the upcoming days, we look forward to sharing new ideas and forging deeper bonds and friendships.

Sincerely,

Florence Lowe-Lee
President

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Multilateral Nuclear Energy Dialogue

Forming a Coalition of the Willing

Developing an Institutional Framework for Expanded Global SMR and Advanced Reactor Deployments

Henderson, Nevada, United States

August 26-29, 2019

PURPOSE

Convene a high-level private workshop among a multinational group of experts to discuss the development of innovative institutional models and frameworks to facilitate the global deployment of small modular/advanced reactors, initially from the perspectives of prospective vendor countries.

This meeting builds upon GABI's history and experience with its trilateral (U.S.-Korea-Japan) nuclear energy dialogue series, which primarily focused on multilateral cooperation on spent fuel management, a common challenge for all three countries.

Considering the mounting energy and environmental challenges of the developing world, unlocking the potential of small modular reactors (SMRs) and advanced reactors (ARs) should be a major international priority. However, currently accepted international benchmarks for nascent civil nuclear programs represent formidable hurdles for aspiring entrants. Formulating new models and processes that are appropriate for SMRs and ARs will unleash the accessibility and viability of these technologies, allowing them to be feasibly, safely, and securely deployed in regions and countries where they are most needed.

AGENDA

Monday, August 26

Morning to Afternoon	**Hotel Check-In** The Westin Lake Las Vegas Resort & Spa 101 Montelago Blvd., Henderson, NV 89011
6:30 p.m. – 9:30 p.m.	**Welcoming Reception & Dinner** @ Reflection Bay Golf Club 75 Montelago Blvd., Henderson, NV 89011

Tuesday, August 27

Morning	**Breakfast, Rick's Café** @ The Westin Las Vegas Resort & Spa
8:30 a.m. – 9:00 a.m.	**Meeting Sessions Start** @ Reflection Bay Golf Club **Project Overview and Introductory Session**

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Florence Lowe-Lee – President, Global America Business Institute (GABI)

9:00 a.m. – 10:30 a.m.

Session I: The Big Picture – Climate Change, Energy Demand Growth, and Water Scarcity in the Developing World: Imperatives for SMR/AR Development

The vast proportion of global energy demand and population growth will be concentrated in the Developing World. The need for clean, reliable power is acute in the Developing World, particularly when considering the challenges of meeting basic human needs, promoting industrial development, and supporting electricity-dependent modern societies. The urgency of carbon mitigation dictates that much of this power and energy must come from low-carbon sources, as much of the Developing World is disproportionately affected by climate change. Water scarcity issues further exacerbate growing energy demand in developing countries, as desalination processes typically require large inputs of heat and/or electricity. What role must nuclear play in meeting growing global energy demand, particularly within the Developing World, considering climate change and other environmental imperatives?

Moderator:

Florence Lowe-Lee – President, GABI

Lead Discussants:

- **Chae-Young Lim** – Senior Vice President for Strategic Planning, Korea Atomic Energy Research Institute (KAERI)
- **Nobuo Tanaka** – President, Sasakawa Peace Foundation; former Executive Director, International Energy Agency (IEA)
- **Jessica Lovering** – Director of Energy, Breakthrough Institute

10:30 a.m. – 12:00 p.m.

Session II: Current Status of SMR/Advanced Reactor (AR) Development – Timeframes and Pathways for Commercialization and Deployment

R&D activities in SMRs/ARs are ongoing throughout the world by both private and public sector entities. SMR/AR programs in different countries are at various stages of maturity, and determining timescales for probable commercialization and deployment will be critical for assessing the role of these technologies in addressing global climate and energy demand challenges, developing institutional frameworks, etc. Considering the current situation and challenges, what needs to be done to drive these technologies forward and facilitate the deployment and commercialization of SMRs and ARs?

Moderator:

Jae-Soo Ryu – Head for Global Strategy Team, KAERI

Presenters:

- **Keung-Koo Kim** – Vice President for SMART Development, KAERI
- **Yutaka Sagayama** – Assistant to the President, Japan Atomic Energy Agency (JAEA)
- **Stephen Bushby** – Senior Director, Commercial Oversight and S&T Integration, Atomic Energy of Canada Limited (AECL)

12:00 p.m. – 1:30 p.m.

Luncheon

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Speaker: **Soon-Heung Chang** – President, Handong Global University (HGU); Member of National Committee of Safety and Security

1:30 p.m. – 3:00 p.m.

Session III: Securing SMR/AR Global Deployments – Meeting Nuclear Security and Nonproliferation Challenges

SMRs/ARs pose unique security and proliferation challenges in comparison to conventional large light water reactors. There is concern about how to secure and safeguard next-generation nuclear technologies, particularly in the Developing World. These reactors have lower power output and different fuel cycles than large LWRs. Therefore, they may have attributes more in common with research reactors, which have been deployed in a number of developing countries with relatively little fanfare—what are the safeguards and security challenges associated with ARs and SMRs, and how would they differ from those posed by research and reactors and large LWRs?

Moderator:

Robert Walker – Former President and CEO, Canadian Nuclear Laboratories (CNL) and Atomic Energy of Canada Limited (AECL)

Lead Discussants:

- **Tatsujiro Suzuki** – Vice Director and Professor, Research Center for Nuclear Weapons Abolition (RECNA), Nagasaki University
- **Kenneth Luongo** – President, Partnership for Global Security (PGS)
- **Kwang-Seok Lee** – Principal Researcher, Global Strategy Team, KAERI

3:00 p.m. – 4:30 p.m.

Session IV: Institutional and Capacity Building Requirements for SMR/ARs

Implementing the IAEA's Milestones Approach or an NRC-type "gold standard" regulatory regime may be too daunting a hurdle for many countries interested in nuclear power. What institutions and capacities are needed (and what are superfluous) for initial deployments of SMRs/ARs in entrant states? Can a phased, adaptive, performance-based regulatory framework be implemented in newcomer countries for these technologies? What are the lessons learned from U.S., Canadian, Korean, and Japanese interactions with newcomer countries on issues of institutional development?

Moderator:

Carol Berrigan – Senior Director of Supplier Policy and Programs, Nuclear Energy Institute (NEI)

Lead Discussants:

- **Paul Dickman** – Senior Policy Fellow, Argonne National Laboratory
- **Hugh Robertson** – Director General, Canadian Nuclear Safety Commission (CNSC)

6:00 p.m.

Optional Dinner

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Wednesday, August 28

Morning	**Breakfast, Rick's Café** @ The Westin Las Vegas Resort & Spa
9:00 a.m. – 10:30 a.m.	**Second Day Sessions Begin** @ Reflection Bay Golf Club **Session V: Commercial and Competitive Considerations – Industry Perspectives** *SOEs from Russia and China are posing formidable competition in the global nuclear market. Are there opportunities for international supply chain cooperation in SMRs/ARs? What are the perspectives of industry regarding the previously discussed themes? What types of support are needed in order to bolster the competitiveness of suppliers in the OECD overall?* Moderator: **Chae-young Lim** – Senior Vice President for Strategic Planning, KAERI Lead Discussants: • **Robert Walker** – Former President and CEO, CNL and AECL Laboratories (CNL) and Atomic Energy of Canada Limited (AECL) • **Yasushi Okano** – Deputy Director, Nuclear Energy Policy Planning Division, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, Japan (METI)
10:30 a.m. – 12:00 p.m.	**Session VI: Forming a Coalition of the Willing** *Can a "Coalition of the Willing" develop a new approach or methodology for deploying SMRs/ARs in new nuclear power countries without compromising the pillars of safety, security, and safeguards/non-proliferation? What are the foundations and central points upon which such a coalition can be established?* Lead Discussants: • **Paul Murphy** – President, Murphy Energy & Infrastructure Consulting • **Nobuo Tanaka** – President, Sasakawa Peace Foundation; former Executive Director, International Energy Agency (IEA)
12:00 p.m. – 1:30 p.m.	**Luncheon** Speaker: **Rita Baranwal** – Assistant Secretary of Energy for Nuclear Energy, U.S. Department of Energy
1:30 p.m. – 3:00 p.m.	**Session VII: Developing New Frameworks** – Prospects for international harmonization of standards for SMRs/ARs – Considerations for new standards and models for SMR/AR deployment in newcomer countries – Applicability of IAEA research reactor processes to commercial SMR/AR deployments – Lessons learned from other sectors/industries – Creative approaches to safeguards and security – Steps/conditions required for creating a Coalition of the Willing

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Moderator:
Paul Dickman – Senior Policy Fellow, Argonne National Laboratory
Lead Discussants:

- **Edward Kee** – Founder and Principal Consultant, Nuclear Economics Consulting Group (NECG)
- **Phyllis Yoshida** – Senior Fellow for Energy and Technology, Sasakawa Peace Foundation USA
- **Carol Berrigan** – Senior Director of Supplier Policy and Programs, Nuclear Energy Institute (NEI)

3:00 p.m. – 5:00 p.m. **Session VIII: Where Do We Go From Here?**

- What are the approximate timeframes for some of the proposals and recommendations given during this meeting?
- What are the likely areas for multilateral coordination and cooperation in SMRs and ARs?
- What multilateral collaborations would be critical to ensuring facilitated deployment and commercialization of SMRs and ARs?
- What should be the elements of a broader and coordinated multinational strategy with respect to engagement with nuclear newcomer countries, industry alignment and integration, etc.?

Lead Discussants:

- **Kenneth Luongo** – President, Partnership for Global Security (PGS)
- **Paul Murphy** – President, Murphy Energy & Infrastructure Consulting
- **Edward Kee** – Founder and Principal Consultant, Nuclear Economics Consulting Group (NECG)

5:00 p.m. **Free Time**

Thursday, August 29

Morning **Breakfast, Rick's Café**
@ The Westin Las Vegas Resort & Spa

9:00 a.m. – 11:00 a.m. **Next Steps and Key Takeaways**
@ Reflection Bay Golf Club
Session Chairs:

- **Jessica Lovering** – Director of Energy, Breakthrough Institute
- **Alan Ahn** – Director of Programs and Communications, Global American Business Institute (GABI)

11:00 a.m. **Program Concludes; Hotel Check-Out**

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Session 1: The Big Picture – Climate Change, Energy Demand Growth, and Water Scarcity in the Developing World: Imperatives for SMR/AR Development

ABSTRACT

The vast proportion of global energy demand and population growth will be concentrated in the Developing World. The need for clean, reliable power is acute in the Developing World, particularly when considering the challenges of meeting basic human needs, promoting industrial development, and supporting electricity-dependent modern societies. The urgency of carbon mitigation dictates that much of this power and energy must come from low-carbon sources, as much of the Developing World is disproportionately affected by climate change. Water scarcity issues further exacerbate growing energy demand in developing countries, as desalination processes typically require large inputs of heat and/or electricity. What role must nuclear play in meeting growing global energy demand, particularly within the Developing World, considering climate change and other environmental imperatives?

SPEAKERS

- Florence Lowe-Lee, President, GABI
- Chae-Young Lim, Senior Vice President for Strategic Planning, Korea Atomic Energy Research Institute (KAERI)
- Nobuo Tanaka, President, Sasakawa Peace Foundation; former Executive Director, International Energy Agency (IEA)
- Jessica Lovering, Director of Energy, Breakthrough Institute

SUMMARY

The growing demand for energy and electricity suggests a need for decarbonization to deliver the demand without drastically increasing emissions. Nuclear energy can be the solution to this issue.

- There are a number of emerging markets for civil nuclear technologies, and most of these emerging markets are dominated by Russia and China.
- There are a number of new innovative nuclear technologies as well as business models to address a diverse range of needs.
    - New business models include:
        - Floating and offshore nuclear,
        - Microreactors,
        - Build-Own-Operate (and Remove?)
        - Non-power sector applications (seawater desalination, industrial processes, oil refining, district heating)
- In order to reach deep decarbonization, global emissions will need to be reduced by 80% by 2050 while allowing BAU population growth and 2% annual GDP growth.
    - 12,000 Mtoe annual clean energy generation is needed by 2050, which is equivalent to about 17,000 1 GW nuclear power plants.

There were four large-scale upheavals / revolutions in global energy that set the scene for the new Outlook:

- The US is turning into the undisputed global leader for oil and gas by the Shale revolution.
- Solar PV is on track to be the cheapest source of new electricity in many countries.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

- China is switching to a new economic model and a cleaner energy mix by gas and renewable energy.
- Electricity is broadening its horizon, spurred by cooling, electric vehicles and digitalization.
- Of these four large scale upheavals, three of them are being led by China

The US is the world's largest crude oil producer ahead of Russia and Saudi Arabia. The US is the undisputed leader for oil and gas due to the shale revolution.

- By 2035, almost 90% of Middle Eastern oil exports go to Asia.
- North America's emergence as a net exporter accelerates the eastward shift in trade.
- Closure of the Persian Gulf would result in a total supply loss of nearly 16.5 million barrels per day.

China will be the largest importer of LNG, while the US will be the largest exporter. The trade war between China and the US may affect this balance to a large degree.

- China's interest in ensuring cost-effective, and diverse energy sources to support its economic growth drive its overseas energy investments.
- China is hoping to obtain half of its gas from pipelines, and the other half from LNG imports.
- Russia is moving its pipelines and LNG exports towards the east.

The cost of solar PV and EV batteries are being driven down. Cost reductions of key technologies continue to give strong impetus to the energy transition.

- China's one belt, one road initiative for energy suggests they will develop a strong grid infrastructure to connect renewable energy generation.
- Hydrogen storage is another focus of China's renewable energy drive.

IEA believes that in developing economies, nuclear will be diminishing, while an increase happens in Russia, China, and India.

- In the US, the cost of solar and wind is being driven down, while the cost of nuclear is increasing.
- Hitachi gave up building a reactor in the UK because of cost and the lack of support.
- It is almost impossible to build large LWRs in the developed OECD countries.
- Even in China, the cost of nuclear is still 2-3x as expensive as wind and solar. China is likely to complete builds that are currently under construction, but they are not likely to start many new builds.

Japan should become a leader of non-weapon states for a new NPT paradigm. US-Japan-Korea should collaborate on the IFR as a proliferation resistant and passively safe model.

- Excess plutonium should be put under the IAEA custody.
- Japan can purchase plutonium and S. Korea could accept enriched uranium from N. Korea to collaborate with the US for the denuclearization of the Korean Peninsula.
- Likeminded countries should be invited to the trilateral collaboration on IFR with the commitments for peaceful use.
- Japan signs to the Nuclear Weapon Ban treaty and requests other weapon states to reduce weapons.

Japan has investigated the technical feasibility of using IFR to clean up and recycle radioactive materials and waste.

- Japan is highly interested to use Fukushima as a testing site for these technologies.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

According to BP data, energy consumption will be increased every year, but the dominant energy consumption will come from coal, oil, and natural gas.

- The global share of coal and oil are decreasing in primary energy consumption, with renewable making up for decreased fossil fuel use. Nuclear remains relatively constant in global share of consumption.
- As China grows to become a large electricity generator, CO2 emissions are also expected to grow from this region.

Wind electricity generation and solar PV electricity generation has drastically increased in the previous years, while nuclear electricity generation has not changed. These trends are driven by market selections.

- While many attribute the rising costs of nuclear construction to catastrophes such as Fukushima, Chernobyl or Three Mile Island, the costs have been rising since before the time of these accidents.
- Korea is the only exception to rising construction costs in the nuclear industry.

The world is gradually building a different kind of energy system.

- The electricity sector is experiencing its most dramatic transformation since its creation. Electricity demand is expected to increase by 60% to 2040.
- Flexibility is key to new power systems.

There is a possibility that the investment environment of NPPs will be changed internationally. SWOT analysis of SMRs shows strengths in securing inherent safety, more favorable public acceptance, flexibility on capacity both on and off grid, easier capital risk management, and possible exploration of new markets.

- Attractiveness of large scale NPPs will be gradually decreased, except for nuclear sovereign countries which have government-owned companies.
- Investment attractiveness on SMRs can be increased if uncertainties are removed including licensing and demonstration on time and on budget.

QUESTION & ANSWER

Q: *The French submarine reactors are not highly enriched, right*?
A: They're medium at around 20%. The size of the reactors is getting bigger.

C: *Canada finds itself in a fairly unique position today that come from the reality that Canada has two non-traditional markets that have the potential to be the pull for SMRs: heavy industry (resources and mining), and isolated communities. We're in a situation where both those markets have deficits in energy solutions today, with renewables unable to capture their demand. The paradigm shift for SMRs is that you can't build just one. The economics work when you build a fleet. Canada has a niche role that can be played in this.*
A: Something I looked at is the learning curve of aircrafts. They put a similar investment into the commercial development, but by the time they have the first model coming out, they already have 400 orders for that model. Maybe we need to have customers lined up.
A: That's a chicken or the egg problem. Maybe government needs to subsidize a factory.
A: We've started to change the FOAK model to first dozen of a kind. If we approach individual communities or individual mines, we are going to fail. We need to approach these markets together.

C: *The new paradigm is cost. The cost and growth graphs for solar PV are remarkable. When you look at it from a photonegative perspective, maybe we need to look at it as what niche nuclear fills. Where do renewables top*

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

out? What regions and countries are not suitable for the deployment of renewables? Korea is developing renewables, but they're looking at offshore wind. Is that acceptable to fishing communities? Not at all. Look at Ottawa, where you can't build any solar PVs. It's not clear to me that there's a map where renewables don't work.

A: A lot of new technologies start in niche markets. Critics are saying that these niche markets are not big enough, but if you can combine these niche markets with government support, you can build the first of a kind and get the demand rolling out. You have to sort of find where the niche is, and where nuclear is a good choice.

A: But there are not enough mining companies to make this sustainable.

A: You only need to find a dozen so that others can see the demonstration and create more demand.

A: You're talking about a lot of different companies competing in this conceptual marketplace. My feeling is that if the four major countries represented here don't walk away with some serious cooperation, I don't see how we can move nuclear forward.

A: The window for nuclear as a feasible solution is closing soon. Speed to market is another factor that needs to be looked at. If it takes 50 years to bring a conceptual design to market, it'll be too late. If we don't start picking winners now, I think you'll miss the window.

A: There are a lot of nuclear developers with little money being spread around. What are the rules here? The Department of Energy doesn't want to pick winners because their track record for picking winners is very poor. This is already an industry that's not popular. Everyone that I've spoken to agree with the logic of downselecting, but there's no process for it. I think you need to sharpen this pencil because at the moment, it doesn't write.

A: There may not be a guideline, but there's got to be some kind of downselection or else everyone's going down.

A: Is there any multilateral process to speed up the downselection process?

A: In terms of letting the market downselect, there is a little bit of narrowing in terms of which companies are engaging with NRC in pre-licensing. The NELA has proposed to fund 2-5 demonstration plans.

A: I read that act and I came away thinking that this is a dream. The bureaucracy does not have the capacity to make the downselection. There will be a number of lawsuits when certain technologies are not selected. I don't know if there is the budget for this.

A: I think the big question is the dramatic change in energy demand. Information technology will change dramatically, and this may also effect demand. Reducing energy consumption is much faster than delivering energy for a larger demand. Looking at the history of nuclear power, any nuclear business can succeed without government intervention, but nobody can guarantee nuclear success without government intervention. Furthermore, even one more nuclear accident will kill the nuclear industry. This accident can happen anywhere. How can we stop the next nuclear accident? Even if we understand the need for nuclear power, any serious accident will kill the industry. Public acceptance is another issue.

A: There's another issue. There are election cycles, so even if there is government support, there is no way to guarantee that there will be support for long enough to support the development cycle of nuclear. Especially with the more polarizing politics, the political interests can change drastically. We need to find a stable policy framework. I think that is a fundamental issue that needs to be addressed.

A: I think that this piece of legislation mentioned is one step. It's clearly a bipartisan bill. UCS recently supported nuclear, and they are historically a very strongly anti-nuclear organization. It's not as fractious. Candidate Yang came out with a climate policy yesterday that has a 50 billion dollar contribution to nuclear.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

C: *Where does nuclear fit in a world of renewables? If you invested billions of dollars in renewables, and you live in a hurricane zone, you've got a problem. Ultimately, in some markets where solar is killing the market you can't load follow with nuclear. Nuclear would rather not load follow, and I don't think we've figured this out.*

C: *In Korea, solar cannot match other technologies even if the technology is free because of the land cost. Every solar cell needs a battery to be stabilized, but the battery cost is much more than the electricity generation itself. Electricity generation is cheaper, but electricity generation with storage is very expensive. If you consider the land cost, storage cost, and grid cost, even the low cost of solar PV cannot match other generation sources. Maybe this can help guide where nuclear can fill the gaps where renewables cannot. If you exaggerate solar too much, then natural gas will fill the role. Even if you point out the market economy, it's difficult for nuclear to survive in the market economy. Small business can work for renewables, but nuclear needs government support from both a financial and regulatory point of view. Concerning IFR, it's very interesting. Japan is working on oxide fuel and PUREX, and Korea is working on pyroprocessing, but these are very different from IFR. US does not like to cooperate on the IFR. So I'm interested that recently the US and Japan agreed to work on the IFR.*

C: *Some of the questions I heard being brought up in this session were, finding niche markets where nuclear can fill the gap that renewables cannot, long term policies that go beyond government administrations, and where does nuclear fit into a world of renewables? Typically, even though we don't have state support of nuclear in the US, the government has played a role in stimulating demand for renewable technologies through production and investment tax credits. There's a little bit of movement on getting nuclear on the same playing field as renewables whether it's to add them into RPS at the state level or otherwise. There is more of a push to sign PPAs with nuclear. Even if that changes from administration to administration, these can be longer lasting solutions that go beyond changing politics.*

C: *A more decentralized grid can be helpful to nuclear, as it was mentioned in the case of Canada's markets. The Japanese problem is that the renewables are becoming cheaper, but the grid is rigid. Grid connectivity issues contribute to blackouts. To make this happen, I am proposing that TEPCO should give up nuclear and give it to someone else. TEPCO can be reformed to work on grid connectivity issues. Only nine reactors out of fifty are working in Japan. There's no starting of the nuclear power plants in the next year. If there is no working reactor, how can we maintain the human resources for nuclear power? Nuclear is more of a national security issue, that can suggest a need for a nuclear submarine or nuclear icebreaker. Japan is not interested in having weapons, but to reduce the weapons in other countries, countries that cooperate with Japan on nuclear should be asked to give up their nuclear weapons.*

C: *The future electricity demand may not increase if energy demand is reduced or if energy efficiency is realized. Some argue that because of technology improvement, electricity demand in the household sectors could increase based on preference. Most cooking in the household is done by natural gas, but more people prefer to use electricity these days. We cannot say whether electricity demand will increase or decrease based on technology improvement.*

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Session 2: Current Status of SMR/Advanced Reactor (AR) Development – Timeframes and Pathways for Commercialization and Deployment

ABSTRACT

R&D activities in SMRs/ARs are ongoing throughout the world by both private and public sector entities. SMR/AR programs in different countries are at various stages of maturity, and determining timescales for probable commercialization and deployment will be critical for assessing the role of these technologies in addressing global climate and energy demand challenges, developing institutional frameworks, etc. Considering the current situation and challenges, what needs to be done to drive these technologies forward and facilitate the deployment and commercialization of SMRs and ARs?

SPEAKERS

- Jae-Soo Ryu, Head for Global Strategy Team, KAERI
- Keung-Koo Kim, Vice President for SMART Development, KAERI
- Yutaka Sagayama, Assistant to the President, Japan Atomic Energy Agency (JAEA)
- Stephen Bushby, Senior Director, Commercial Oversight and S&T Integration, Atomic Energy of Canada Limited (AECL)

SUMMARY

SMART is an advanced integral reactor that serves a dual purpose, such as electricity generation, seawater desalination or district heating.

- The standard size of SMART is designed to deliver 100MW of electricity and 40 thousands tons of fresh water simultaneously.
- Based on Korean consuming standards, this electricity and water supply will be sufficient to serve a cities with populations of 100,000 people.
- Korea has developed SMART technology since 1997. In the early development stages, the focus was placed on reactor and safety system development. The SMART standard design approval project was launched in 2009, and the concentration was placed on standard design, comprehensive technology validation, and licensing review. After intensive licensing review by NSSC, a standard design approval for SMART was issued on July 4th, 2012.

The SMART technology is a sensible mixture of proven technologies and innovative concepts.

- From a solid PWR technology base, KAERI implemented many innovative technologies such as an integral reactor concept, a modularization concept, a passive safety system, and a fully digitalized control system, among others.
- SMART is an integral reactor. All major components are installed in a single pressure vessel and large connecting pipes are not needed. By removing large connecting pipes, a simplified safety system is sufficient to protect the reactor core.

In order to validate the SMART technologies, KAERI planned a comprehensive technology validation program from the beginning of SMART development, in which more than 50 kinds of tests and experiments are performed. Outcomes of these programs were compiled into technical reports and submitted as the technical background information for the licensing review.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

- KAERI manufactured a full scale of the fuel assembly for a fuel performance test while carrying out critical He at Flux measurement tests.
- KAERI performed a separate effect test including passive residual heat removal system heat exchanger characteristics tests, safety injection tests, pressurizer characteristics tests, and more.
- KAERI also performed integral effects tests using small scale SMART integral test facility called VISTA whose height scale is 1/3 and the volume scale is 1/1,200.
- In 2012, KAERI constructed the world's most unique and largest integral test facility called SMART-ITL and has performed various tests simulating design basis events. The height scale is 1:1 real scale, and the volume scale is 1/49. KAERI also manufactured a full scope dynamic mockup of the main control room and performed operator's action simulations by inviting real nuclear power plant operators.

Korea developed SMART from 1997 to 2015, but starting in 2015, Korea and Saudi Arabia launched a three-year pre-project engineering design project for the construction of the first two units of SMART in Saudi Arabia.

- Both countries will further cooperate on the commercialization and promotion of the SMART reactor to other countries. This cooperation is atypical, especially between a technology seller and technology buyer. Both countries are partners: they will jointly develop the technology, share ownership of SMART and jointly promote it.

In order to introduce NPPs to a country, various infrastructures are required. The IAEA summarized 19 of those in the IAEA Milestones Approach for Nuclear Power Infrastructure Development.

- It is not easy for newcomer countries, especially smaller nations, to establish the necessary infrastructure on their own. Thus, Korea and Saudi Arabia will provide core services for SMART deployment, such as technical support, maintenance, training and education, and licensing support.

Korea has several Advanced Reactor (AR) models based on the GEN-IV technologies.

- Korean SFR has been developed for a long time, and the PGSFR has been designed for technology demonstration of TRU transmutation recycled from LWR spent nuclear fuel.
- Another AR model is the VHTR for hydrogen. Key technologies for the VHTR have been developed, and recently the whole project was modified to key technologies of VHTR.
- KAIST is developing a small integral reactor, called ATOM, an autonomous SMR. They are focusing on autonomous operation and soluble boron free operation.
- New SMR for ship development was launched. Universities, UNIST, and some companies will participate in this project. It is currently in the planning stage.

Since the Fukushima Daiichi accident, Japan's evaluation of the Fast Reactor Cycle Technology Development Project (FaCT) phase 1 was suspended, and FaCT phase 2 was postponed. After the accident, efforts were focused on the maintenance of the technology basis, R&D to enhance safety of the Fast Reactor, and the reduction of the amount of potential high toxicity of high-level radioactive waste.

- Phase 1 of FaCT was the decision making process for the adoption of innovative technologies, including the performance test of the reactor core at MONJU.
- Phase 2 of FaCT, which was postponed, included the confirmation of feasibility of innovative technologies, conceptual design of the demonstration reactor and commercial reactor, and performance tests, which would eventually lead to the construction of a demonstration reactor.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Japan and France has been collaborating bilaterally on the ASTRID project. General arrangement between both governments was concluded in May 2014.

- The collaboration included design and R&D. The design tasks were focused on active decay heat removal systems, passive shutdown systems, seismic isolation systems, above core structure, core catcher, main vessel, polar table, transient evaluation and general discussion.
- The R&D tasks were focused on three main areas: fuel, severe accident, and reactor components.

Japan's current nuclear policy is to promote the nuclear fuel cycle including the fast reactor development.

- New goals for fast reactor development include maintenance and development of the world's highest technical basis, development and future commercialization of fast reactors which will attain enhanced safety and economics, leading to achieve international standardization, and specifying development targets for the fast reactor.
- The four principles for fast reactor development are the utilization of national resources, application of the world's cutting edge knowledge, pursuit of cost efficiency, and the establishment of a development system.
- The Japanese cabinet formulated the Strategic Roadmap of fast reactor development. This roadmap includes the achievement of the effective use of resources by reducing the amount and potential toxicity of high-level radioactive waste, as well as ensuring the highest level of safety, aiming at further cost reductions, and flexible approaches which can respond to future uncertainties.

Japanese METI launched the Next Energy x Innovation Promotion (NExIP) project to support the private sector to develop nuclear technologies which enhance safety, economy and maneuverability of the nuclear power plant.

- Under the NExIP program, two categories of technologies will be subsidized: innovative nuclear technologies to meet social requirements, and technologies enhancing the safety NPP.

Japan is working on an experimental fast reactor, called Joyo.

- The objective of the Joyo experimental fast reactor is to verify the principle technology of FBR and to conduct irradiation tests of fuel and materials.
- Japan is collaborating with the US on the development of the VTR.

Japan also has a prototype fast breeder reactor, called Monju.

- The objective of this fast breeder reactor is to verify the function as a power reactor. It reached first criticality in 1994, and it was decided to be decommissioned in 2018.

There are still some remaining amounts of fuel debris and nuclear materials from the TEPCO Fukushima Daiichi plant.

- The distribution fraction of heavy metals (TRU+U+FP) has been estimated at each of the three units. In unit 1, approximately 100% is located in the MCCI debris. In unit 2, approximately 50% is in the core region debris, with the other 50% in the MCCI debris. In unit 3, 90% is located in the MCCI debris, with 10% remaining in the core region.
- The amount of fuel debris can be processed within 10 years. In 25 years after launching the IFR, the 1.9 tons of TRU present in the debris will be reduced to a total of 1.2 tons in the reactor and in the

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

spent fuel. Because of the shortage of TRU required to fabricate fuel, it will be necessary to produce TRU from breeder reactor core or external sources in order to continue operation of the reactor.

The Generation IV International Forum was the first "coalition of the willing".

- Prior to the GIF, Canada was focused primarily on the SCWR technology. Expertise and facilities developed for GIF directly align with SMR needs, and the sole focus on SCWR is being reconsidered.
- GIF nations are considering how the IP developed under GIF will be accessible or not by SMR vendors.

Canada's current nuclear S&T priorities include supporting the development of biological applications and understanding the implications of radiation on living things, enhancing national and global security by supporting non-proliferation and counter-terrorism, nuclear preparedness and emergency response, supporting safe, secure and responsible use and development of nuclear technologies, and supporting environmental stewardship and radioactive waste management.

- SMR/AR development and associated energy technologies are part of a broader S&T portfolio. Projects range from basic R&D to mid Technology Readiness Level (TRL).

Canada has a number of emerging markets that may potentially be looking to deploy SMR technologies.

- Northern Canada is one emerging market. There are over 200 largely indigenous communities reliant on diesel generation.
- Resource extraction industries are also looking to use SMRs for hydrogen production for oil sands bitumen upgrading, power for in-situ and surface extraction sites, and vSMR for mineral mining sites.
- Low carbon energy agendas are also looking at SMR technologies. Larger, grid-sized SMR designs could enable a significant shift away from coal-fired generation, as demonstrated in Ontario.
- The fleet approach will be essential for vSMRs and SMRs. Business models will be entirely different including the role of government as partners, not funders.

Canada has developed a Pan-Canadian SMR roadmap that charts a national path forward for SMRs.

- This plan will be a one year, multi-stakeholder effort that spans over 4 provinces, 2 northern Territories, and 5 electric power companies.
- The collective vision is to realize SMRs as a safe, clean, affordable energy, opening opportunities for a resilient low-carbon future. The path forward suggests that success relies on strategic partnerships across the sector and internationally with the idea that no single organization can do this alone.
- CNL is hoping to develop a path to SMR demonstration by 2026. There are 10 sites being looked at along the Chalk River, and 12 sites being looked at in Whiteshell. Stage 1 is a prequalification, stage 2 is due diligence, stage 3 is negotiation of land arrangement and other contracts, and stage 4 is project execution.
- There are currently 3 companies that have completed stage 1 and have been invited to stage 2. StarCore Nuclear's proposed SMR design is a 14 MWe high-temperature gas reactor with a proposal to build reactors at both Whiteshell and Chalk River sites. Terrestrial Energy's proposed SMR design is a 190 MWe integral molten salt reactor. UBattery's proposed SMR design is a 4 MWe high temperature gas reactor.
- Ultra Safe Nuclear Corporation / Global First Power has completed stage 2 and is currently in stage 3. Their proposed SMR design is a 5 MWe high temperature gas reactor.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

- There are a couple of considerations that Canada has made with SMR deployments. First is the cyber aspect. To be financially feasible, very small modular reactors at off-grid locations will have to be operated autonomously and monitored remotely. Additionally, underground operation will pose some concerns such as freeze-thaw effects on structural integrity of concrete, arctic/permafrost conditions on structural supports, crack-monitoring using fiber optic sensors and monitoring concrete properties using embedded sensors.
- Canada is also looking to include hydrogen production as a process that nuclear technologies can be utilized for.

QUESTION & ANSWER

Q: *Except for SMART with cooperation with the Kingdom of Saudi Arabia, there are no international partnerships that you indicated on your presentation, right?*
A: Yes. Only SMART.

Q: *Isn't that multilateral cooperation a biased perspective of Korea?*
A: I don't think so. KSA and ROK have a co-ownership, so KSA can do their own collaboration in the future.

Q: *Are you working on only SMART on the perspective of the next generation nuclear model?*
A: We are currently working on large scale SFR as well.

Q: *Did the three companies that you mentioned that are on the 1st stage not make the second stage?*
A: They are at the prequalification stage currently.

Q: *Is this downselect to one or multiple designs?*
A: It can be possible for multiple designs since this is a process to access federal land, but it needs to be careful.
A: There are lots of barriers to commercialization, so we don't want to make any judgments soon.
The issue is whether we can actually process facilities. It's not an equity case.

Q: *Will it be Government's negotiation or judgment of site decision?*
A: Depends on the energy needs of the sites. The vendor will negotiate.

Q: *Will there be financial support from the government?*
A: Not currently, but the candidate received lots of investment so I cannot guarantee that they did not get any funding from the government.
A: There are some programs under which Canadian companies can apply for the R&D funds.
Luncheon Speaker – Soon Heung Chang

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Luncheon Address: Global Perspective of Nuclear Power

ABSTRACT

Nuclear energy has a relatively good safety record when it comes to number of deaths, despite public perception. In order to meet the goals set forth by the Paris Agreement in 2015, nuclear must play a significant role in the energy mix. Nuclear power is seen as the largest contributor to meeting the IEA's 2 degree scenario.

SPEAKERS

- Soon-Heung Chang, President, Handong Global University (HGU); Member of National Committee of Safety and Security

SUMMARY

Nuclear energy has a relatively good safety record when it comes to number of deaths, despite public perception. In order to meet the goals set forth by the Paris Agreement in 2015, nuclear must play a significant role in the energy mix. Nuclear power is seen as the largest contributor to meeting the IEA's 2 degree scenario.

- Currently, there are 56 new reactors under construction in the world, with 39 of these new builds in rapidly developing countries in Asia.
- In Korea's case, there are a number of cost advantages of nuclear power.
    - Reactors are proven to be competitive low-cost generators.
    - High initial upfront investment costs are fully depreciated, and only operating and fuel costs are charged.
    - These cost advantages are the prime reason for utilities seeking license extensions, and performing safety upgrades and power uprates.
- In the US, the rapid expansion of shale gas production has led to sustained low natural gas prices which are suppressing prices in wholesale power markets.
    - In the face of this economic pressure, many NPPs are being shut down as they cannot compete with the low cost of natural gas.

There are a number of proposed solutions for improving safety and confidence of nuclear technologies.

- Improving public confidence may be integral to gaining support for widespread nuclear deployment.
- Developing accident tolerant fuels can provide high stability in high temperature for delay of fuel melting in a severe accident.
- Innovation in autonomous future reactors can provide enhancement of productivity and safety due to super-connectivity and super-intelligence.
- Developing passive safety is important to prevent large release of radio-nuclides by passive

containment cooling or controlled venting of steam and non-condensable gasses. This would also help in improving public confidence.

- Managing spent fuel is a more urgent issue in countries with smaller available land such as S. Korea. Recycling options can be taken to reduce the environmental burden of spent fuel.
- Solutions for improving economics of nuclear power plants include minimizing construction time, maintaining a stable supply chain, carbon credit, and maximizing safe plant life-time.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

QUESTION & ANSWER

Q: *You talked a lot about the radiation levels from Fukushima. Why is the Korean government attacking the Japanese government over the release of tritiated water?*

A: Korean government is upset. I emphasized the partnership for the global supply chain. Korean feels attacked by the supply chain of the semiconductor chips. Thus, Korea counterattacked.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Session 3: Securing SMR/AR Global Deployments – Meeting Nuclear Security and Nonproliferation Challenges

ABSTRACT

SMRs/ARs pose unique security and proliferation challenges in comparison to conventional large light water reactors. There is concern about how to secure and safeguard next-generation nuclear technologies, particularly in the Developing World. These reactors have lower power output and different fuel cycles than large LWRs. Therefore, they may have attributes more in common with research reactors, which have been deployed in a number of developing countries with relatively little fanfare—what are the safeguards and security challenges associated with ARs and SMRs, and how would they differ from those posed by research and reactors and large LWRs?

SPEAKERS

- Robert Walker, Former President and CEO, Canadian Nuclear Laboratories (CNL) and Atomic Energy of Canada Limited (AECL)
- Tatsujiro Suzuki, Vice Director and Professor, Research Center for Nuclear Weapons Abolition (RECNA), Nagasaki University
- Kenneth Luongo, President, Partnership for Global Security (PGS)
- Kwang-Seok Lee, Principal Researcher, Global Strategy Team, KAERI

SUMMARY

The world plutonium stockpile is increasing steadily mainly due to civilian reprocessing. Japan has the largest stockpile of plutonium coming from four nuclear reactors. Sasakwa Peace Foundation has proposed policy on the international management of plutonium.

- International storage of plutonium should be pursued.
  - Excess stocks of plutonium should be defined as stocks of plutonium exceeding reasonable working stocks. It would be desirable for the Japanese government to decide reasonable working stocks according to the fuel cycle situation, while listening to the views of an IAEA experts group. Rights to use this excess plutonium can be resotred once Japan has confirmed a plan for its use. Reprocessing should be carried out at a controlled pace until the excess plutonium stock reaches zero.
- Guidelines for the management of plutonium should be strengthened.
  - Current guidelines are voluntary guidelines by nine countries with holdings of separated plutonium. The current guidelines can be strengthened along the lines of the announcement by Japan's Atomic Energy Commission.
- Reducing existing stocks with international cooperation.
  - An international forum on the disposal of plutonium stocks can be established among the five countries who currently have large plutonium stocks. An effective approach for early reductions would be to carry out the plutonium stockpile reduction through international collaboration.
- Priority should be given towards dry storage for spent fuel management, and a third party agency should assess the options for the nuclear fuel cycle.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

  - From the standpoint of nuclear security, it is proposed that spent fuel be moved from storage pools to dry storage as early as possible.
- Japan should play a leading role in globally promoting new international norms for plutonium.
  - Japan has declared its commitment to helping minimize global fissile material stocks. To fulfill that commitment, Japan should play a leading role in making the above four points into new international norms.

SMRS show future promise in satisfying and contributing to new international norms.

  - SMRs without requiring reprocessing can be deployed with minimum non-proliferation and nuclear security risks.
  - SMRs can also burn excess plutonium stocks and can contribute to stock reduction, assuming its spent fuel will not be reprocessed again.
  - Large deployment of SMR will increase the need for enrichment capability.

The potential value of advanced reactors is significant as the global community faces new and evolving challenges of the 21st century. GNI assessment found five major results.

- Advanced reactors are an important component of the global strategy to reduce carbon emissions to zero.
- There is high confidence that any of the advanced reactor concepts can be safeguarded to prevent nuclear weapons proliferation.
- There are characteristics of advanced reactors that can support improved nuclear security and prevent unauthorized radioactive release.
- The international community must ensure from an early point that any race for market share among key geopolitical competitors strengthens nuclear governance rather than weakens it.
- There must be political and public confidence in this new class of reactors.

All the advanced reactor types can be safeguarded, but the approaches will differ from LWRs and both the IAEA and reactor designers will need to work together to ensure cost-efficient and operationally effective "safeguards by design."

- None of the advanced reactor design categories can be safeguarded in the same manner as LEU-fueled LWR.
- Both the IAEA and the reactor designers should take steps in the design phase to facilitate effective international safeguards.

There were a number of security conclusions from GNI's assessment.

- Nuclear materials, unirradiated and irradiated in storage and in transport, must be adequately protected in all reactor types.
- Further information wil be required regarding both the general reactor design and the technical specifications, to reliably assess the vulnerability of specific advanced reactors to an act of sabotage.
- There is no unified or global approach to cyber security in the civil nuclear sector. There is little discussion across borders among nuclear regulators or reactor cyver security professionals. Emerging technology implications and applications must be further assessed.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

- How remote the area is, where it is deployed, whether it is built above ground or below ground, and how prepared the nation in which it is deployed for nuclear operations and emergencies are all important factors to consider in reactor siting.

There are some creative approaches to safeguards and security. Issues to consider include:

- Fuel cycle and deployment approaches that inherently reduce the proliferation and/or security danger,
- Business models for sales, deployment, and operations that can reduce the proliferation and security dangers,
- Designs with inherent safeguards and security, and how that danger mitigation is value assessed,
- Development and provision of guidance for IAEA consideration.

Advanced reactors cannot be divorced from the critical issues of geopolitics, particularly with regard to Russia and China.

- Nuclear power has a significant international security value beyond energy, and both Russia and China have tied nuclear exports to their geopolitical objectives with offerings of new arrangements and financing with the goal of increasing their international influence.
- Russia's ROSATOM has presence in 44 countries and is building reactors in half a dozen of them.
- By 2026, China is projected to overtake the US as the world's top nuclear power generator.

A critical element of the 21st century is the race for technological dominance and global influence. Advanced reactors and SMRs are essential components of the global technology battlefield.

- Recommendations on geopolitics and governance include support for nuclear newcomers, the creation of a new nuclear alliance, and avoiding the race for the bottom.

Ensuring the high standards of nuclear security and safeguards is an important issue in global nuclear security and nonproliferation as a method of expanding global SMR/AR deployments.

- There are a number of different positive and negative attributes for each of the characteristics that SMRs and ARs can provide.
- A framework for helping discussions and actions can help in reflecting positive attributes to norms and guidelines and deriving measures to respond to negative attributes.

QUESTION & ANSWER

Q: *Are you suggesting the creation of an excess plutonium storage facility?*
A: No. The plutonium does not have to be moved. It can be designated under different ownership.

Q: *What happens if the multilateral cooperation was in ways to get industries and governments working together in fleet approaches to SMR development?*
A: I still don't see where the fleet is. I listened this morning to the presentation on Canada, Japan, and South Korea. It's not yet clear to me how you're going to be able to do this in fleets. It's going to be hard to answer that question.
A: From the discussions I've had with vendors, they come forward with ideas on where they will get the fuel from. The question is whether that's realistic. My sense is that we're asking a lot of vendors to put forth

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

business models that can work financially but are also viable from a regulatory and IAEA perspective. This is a hail mary. Can we get the fleets?

A: If I were top level of government, there's only one way I can frame this. It would be: what do I want the nuclear environment to look like in 2050. At the top of the list, I would not want two authoritarian governments to running the show. I would then look at what that means for my country and what alliances we can form as well as what barriers we need to break down. There is an ongoing dispute between two major companies that for completely obvious reasons need to work together.

A: Some of the things you say you want are some things that a company won't get any benefit from. They would argue who would get profits on a sale, not on the geopolitics.

A: I'm not against subsidizing the security of the world. There are crimes against humanity and crimes against taxpayers.

A: I don't know the exact answer to your question, but I do know this. The governments represented at this table are well financed enough. At the end of the day, you need energy diversity and energy security.

A: I think the question of who will prepare is important. I think vendors and IAEA should prepare. I think our job is to encourage them to do their preparation.

A: I think IAEA sticks to their current system. When SMRs are deployed in around 2030, our society will be totally changed based on ARs and IoT. I think we should focus on that, not only material accounting. We can develop models for adaptive safeguards especially focused on process monitoring.

A: When you have a discussion like this, you have to involve the regulators. Any new technology can bring benefits, but you have to convince regulators. I think it's better to talk to regulators and make sure that we understand the conditions that they require for us to meet. I think the point is that technical future of the reactor is only a part of the whole discussion.

Q: *I don't know about the details of the separated civilian plutonium. Is it weapons grade plutonium?*

A: It's reactor grade plutonium. But it is dangerous.

A: Reactor grade plutonium is pretty lousy stuff. It doesn't make very good bombs, but you can use it to make detonations up to a point. If you have the ability to make reactor grade plutonium, you also have the ability to make weapons grade plutonium. The sophistication required to do this is not a terrorist organization: it would be a nation state.

C: *We have talked about SMRs but none have ever been built. Only SMART has a design approval. I'm very pessimistic of SMR.*

C: *IAEA is not going to move quickly. You have entities within the organization that try to obstruct things. If I saw a new effort to make it easier for OECD to deploy small reactors to the developing world, Russia and China would gracefully obstruct this process. We need to go fast. If you were to say in Vienna that you want to create a regional regulator, you'd be stoned to death. There's got to be something different. If you look at the milestones document, it says 10-15 years from start to finish. If you look at where the UAE started in 2007, it took them about 14 years. If with streamlined money and government, that it takes 14 years, what will it take for these emerging markets? There's too much institutional inertia to produce anything that we need in the next two years. I think that you have to be careful in going back to the old way of doing things.*

A: You've got China and Russia on the other side of things. We're talking about safety and proliferation resistance. I wonder if the conversations aren't a bit incongruous. What are we going to achieve? Are Russia

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

and China having the same conversations that we're having now about entering new markets? I would bet that they're not having the same conversations. I think if we're heading down this path, this geopolitical question is important. If we need to get ahead of the Russians and Chinese, I wonder if these conversations are bit incongruent to that goal.

Q: *Generally, there is some mention of the negative aspects of SMRs in view of the security or nonproliferation, but there are many positive aspects to the security and nonproliferation of SMRs. For example, it's a small quantity. Also, maybe in the future, there are opportunities for blockchain technologies. Maybe you can use IoT to utilize sensors.*

A: I think the problem at the moment is the overfocus on the technological aspects as opposed to the overall apparatus. We didn't want to specify specific reactor designs. I do think there are some designs that are better than others. What I think you have to do with the point you made is that you need to make this point to the greater community. There are only a few of us that are circulating between the technology world and the nonproliferation world. So I do think that this forum is a good opportunity to exchange those views. The reaction from the AR community for our report was that there was only one complaint. I think it was easily addressed. Part of the message from the workshop that we did was that the IAEA is not well prepared to deal with thinking creatively on how you safeguard these reactors. If it will go through this entity, they have to be better prepared to a little bit more flexible than they currently are, and they have to be more willing to talk to the design community.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Session 4: Institutional and Capacity Building Requirements for SMR/ARs

ABSTRACT

Implementing the IAEA's Milestones Approach or an NRC-type "gold standard" regulatory regime may be too daunting a hurdle for many countries interested in nuclear power. What institutions and capacities are needed (and what are superfluous) for initial deployments of SMRs/ARs in entrant states? Can a phased, adaptive, performance-based regulatory framework be implemented in newcomer countries for these technologies? What are the lessons learned from U.S., Canadian, Korean, and Japanese interactions with newcomer countries on issues of institutional development?

SPEAKERS

- Carol Berrigan, Senior Director of Supplier Policy and Programs, Nuclear Energy Institute (NEI)
- Paul Dickman, Senior Policy Fellow, Argonne National Laboratory
- Hugh Robertson, Director General, Canadian Nuclear Safety Commission (CNSC)

SUMMARY

CNSC has two optional pre-licensing steps to help potential applicants streamline the process. These two steps are the vendor design review and determining an appropriate assessment strategy. The vendor leverages VDR results in discussions with the potential applicant.

- Legislation in Canada establishes the licensee as being ultimately responsible for safety.
- The use of new technologies with little or no operating experience drives the greater use of professional/engineering judgment in decision making.
    - Processes are needed, among other things to inform setting scope and depth of technical assessments commensurate with novelty, complexity, and potential for harm; determine the safety significance of potential issues; and initiate regulatory response appropriate to the safety significance.

Global First Power (GFP) is Canada's first SMR project. The project was initiated to build and operate a single module (15 MWth) micro modular reactor (MMR) on the Chalk River Laboratories site.

- The public was notified of the application.
- The commercial full-scale demonstration project of an HTGR power plant design is privately owned.

Vendors may use any credible information to support their safety claims, including information reviewed by their national nuclear regulatory authority. Credible information includes relevant operating experience, quality assured R&D results, and validated analytical data.

- The vendor is expected to demonstrate how that information supports their case to meet Canadian regulatory requirements.

There does exist international collaboration on SMRs.

- CNSC is working closely with IAEA, WGRNR, and the NEA on sharing best practices in regulating SMRs.
- The IAEA SMR regulator's forum enables discussions among member states and other stakeholders to share SMR regulatory knowledge and experience. This forum enhances nuclear safety by identifying and resolving common safety issues that may challenge regulatory reviews associated with SMRs.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

CNSC's process for traditional LWRs is linear, but the SMR licensing processes is not as linear.

- CNSC signed MOC with NRC aimed at enhancing technical reviews of advanced reactor and SMR technologies. The MOC entails that both regulators will ensure safe, efficient development and deployment of new reactor technologies both now and in the future.
- CNSC and NRC are meeting in October to discuss options under the MoC. Options may include collaboration on pre-application activities to ensure mutual preparedness and development of common approaches to resolve common technical issues.
- There are opportunities for further collaboration in leveraging technical assessment information for common designs, ensuring greater ability for regulatory acceptance of foreign standards and codes, and utilizing trusted regulators and industry partners to help with international supply chain inspections.
    - Industry can work in a collaborative manner without compromising intellectual property.

In a bilateral basis, two countries can agree on how to proceed on a regulatory process.

- Canada and the US do not share regulatory frameworks. Canada's process is very site-specifically driven. In order for the two countries to have a broader view of things it would be better to have a bilateral relationships than multilateral relationships because it complicates things.

The UAE is a classic example of a country that made significant governance investment. The UAE came to the NRC and showed commitments to move forward. The Emirates are moving through the 19 milestones, which has 3 phases. The new business models and SMRs will not follow that pattern, so change needs to be made. There has to be a shift in how greeting newcomer countries into a phased, adaptive approach. How this is handled is something we need a solution for.

- For the US and the international community to look at this, take a look at what was done by Korea for the SMART reactor program.
- Korea is truncating the 19 milestones approach.

Barakah is not operating today because they do not have the people who can operate the plant. It's very clear that even if all the other things are done, without human resources to operate a plant, you can't operate a plant. This also shows there are some problems with integrating foreign workers into a national plant. SMRs and ARs offer a lower threshold for human resources.

- Without operating experience, how do we know how many people we need to operate an SMR? This means countries that want to produce and export SMRs need operating experience. Without that operating experience, it's hard to make that sell without knowing some details regarding operation.
- Human resources and operating experience are necessary to building a phased, adaptive approach.

QUESTION & ANSWER

Q: *In literature, there's some talk about how SMR manufacturing can provide regulatory challenges. Can you talk about that?*

A: There's regulatory rethink. I think cooperation will be key, especially in areas with strong regulators.

C: *NRC conducts vendor reviews all over the world. But that assumes that those companies and organizations already have a UA program of interest. Fast forward to the Lake Charles facility in the US. NRC was constantly*

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

there for vendor inspection, and they finally shut the place down. That's a concern. From an NRC perspective, the ability to do inspection as fabrication goes along has yet to be addressed.

Q: *If I got certification from another country, would you guys take it and run with it?*
A: No, but we would see how far it goes in ensuring safety under the Canadian licensing.

Q: *You're speaking about operations of plants, not operations of demonstration reactors?*
A: I'm talking about any experience whatsoever. If you have experience with demonstration and a variety of other things like fuels, that counts towards the experience.
A: I couldn't agree more. Even in the Canadian labs, we're doing things with the purpose of practical experience to show domestic customers. It's not just international borders, but also on the domestic side. If you look at the time frame, if you're going through the four stage process, to have something ready by 2025, you have to have something ready by next week.

Q: *Sounds to me that we're going to have three centers of operating experience in SMRs/ARs. One is going to be in Canada at Chalk River, second is going to be NuScale in Idaho, and the third will be in Saudi with SMART. Is this going to be a competition? We will have different three different nodes. What happens next? Will this become a market competition among ourselves?*
A: I think to a certain extent, these products are fairly differentiated. You won't necessarily have the kind of competition that you think. There will be winners and losers, but there will be a certain amount of market segmentation depending on need that will see a smaller pool of companies competing with each other.

Q: *Is this the downselection process?*
A: The ones that are starting to move forward are moving forward with industry. The ones moving forward are the ones that have established relationships with existing licensees. That's not going to be moved by the government. There may be strategic funding, but the culling of the herd will be part of the process.
A: Let's take a microreactor as an example. In the US we have one company, Oklo. They are on the cusp of going to licensing. They don't have a demonstration bed. Whoever is doing it in Canada might be ahead of Oklo. What happens after that? Does this preclude cooperation because the commercial element is what is ultimately going to drive the choice?
A: Quick comment about the Korean SMART reactor which is essentially a small PWR. The reality is that the SMART is just a small PWR, and NuScale takes a different approach. It's going to fit different markets. MIT came out with a study that said that if you look at risk of deploying plants, it's not in the reactor. It's in the construction of the plant. The guys who can lay out a schedule and construction process to reduce construction risk and produces a technology that requires much less operation, those are the technologies that are going to win. Reducing construction risk will be the largest driver.

Q: *What happens when Department of Defense (DoD) gets into the game?*
A: They have their own interests.

C: *To the point about the competitive versus collaborative space, understanding the global markets is going to help inform which technologies and designs are appropriate. This might be a pathway to identifying requirements.*

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Q: *I'm interested to know what the markets are for SMART? I think that's an area where there is an opportunity for collaboration.*
A: Saudi Arabia chose SMART because they have a lot of diesel generators that are not connected to the main gridline. Saudis produce 10 million barrels a day, and they use 1/3rd for domestic use. Of that, 1/3 of that is spent into power plants. They needed a small nuclear power plant in the area. Southeast Asian countries also show interest. When the country does not have their own resources, they are interested in SMRs.
A: When we developed the SMART, we must follow the commercial reactor regulatory standard. We must meet all the commercial PWR licensing standard. NuScale cut off the number of operating staff, but in Korea, the regulatory body does not allow that kind of concept. We had to separate each control room and each module. We adapted the current proven operation of the PWR. When we got our standard design approval, the regulatory body did not change anything. They took the same regulatory standard for the AP1400. That is the reason why we didn't change too much, but we adapted and implemented some innovative concepts. I agree that operating experience is very important. If the NuScale gets the license and successfully operates, maybe we can change our design. Maybe our regulatory body will be more flexible to provide an SMR license.

Q: *I'm interested to know about what's complementary or what alternative models would look like regarding the IAEA 19 milestones process. What are some of the different models? Does every country with research reactors have a sovereign regulator? Are there possible examples or models for smaller reactors there?*
A: All countries with research reactors went through a process similar to IAEA. They have it but they may not be very sophisticated because they're not power reactors.

Q: *How do we in the US and Canada get these things built in our own countries so we can sell them? Who's going to invest money in these things? They have to make a profit. UAMPS has promise but they're far from being built.*
A: That's an issue. If the world wants to see small reactors deployed, I think there will be a market demand. The question is how we get past the blueprints to the operations. It can't be done without government intervention. In a way, the US has already made the commitment into NuScale. If China is able to build a pebble bed in China, then that's going to be a tough competitor. China is a tough competitor because they're building one of everything.

Q*: Is the advantage of the SMR over LWR in licensing from the small size or the modularity?*
A: That will depend, as there are so many different designs. There are some real possibilities in licensing if they can prove the safety case.

Q: *What would you do differently as a newcomer country with these technologies that you haven't done already? If you were developing a regulator from scratch, is there something you would do differently?*
A: I wouldn't follow the NRC's model.
A: The SMR is inherently safe. It can also easily implement passive safety. Still, SMR designers are focusing on safety enhancements. This is a totally different environment in terms of operation. Even though this provides a small marginal benefit to safety, it may provide a lot of other challenges when it comes to operation.
A: In Canada, there have been teams looking at SMRs and ARs for a while now. Canada has been prescriptive with CANDU reactors, but we're trying to change that. NuScale's design may be inherently safe, but as a regulator, that's not really how we look at it. Some new materials may react differently than we think over a long-term period with new coolants such as molten salts.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Session 5: Cmmercial and Competitive Considerations – Industry Perspectives

ABSTRACT

SOEs from Russia and China are posing formidable competition in the global nuclear market. Are there opportunities for international supply chain cooperation in SMRs/ARs? What are the perspectives of industry regarding the previously discussed themes? What types of support are needed in order to bolster the competitiveness of suppliers in the OECD overall?

SPEAKERS

- Chae-Young Lim, Senior Vice President for Strategic Planning, KAERI
- Robert Walker, Former President and CEO, CNL and AECL
- Yasushi Okano, Deputy Director, Nuclear Energy Policy Planning Division, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, Japan (METI)

SUMMARY

There are at least four paradigm shifts associated with SMRs. The enabler to all of this is technology.

- The first paradigm shift is technology innovation. The smaller size allows for simper designs, lower unit cost, as well as opportunities in new markets. Heavy industry markets, and off grid markets are new opportunities that SMRs can reach.
- The second paradigm shift is market innovation. SMRs offer innovative characteristics that can provide benefits to on-grid power, resource extraction and heavy industry, and remote communities. It is much easier to provide SMR technology to remote communities than to extend the grid infrastructure to reach them.
- The third paradigm shift is fleet innovation. There is enough demand in Canada that can offer hope of building a fleet.
- The fourth paradigm shift is engagement innovation. This is the most problematic paradigm shift. Canada has a different social context today than many years ago, and social scientists say that social values have changed dramatically where people now want their voices to be heard. Risk perception is an issue. There will be well-funded and well-organized activist opposition to the SMR deployment in Canada.
- SMRs can enable a paradigm shift that changes the current landscape of a few large reactors at a few sites with a few host communities to fleets of many small reactors at many sites with many host communities.

There are a number of key elements for SMR fleet deployment.

- The first key element is licensing. Nothing will move forward without licensing.
- The second key element is political, public, and community engagement. Having support from both political parties may allow for a longer lasting policy support for new nuclear deployment that is not easily affected by changing administrations.
- Economics and risk sharing is another element. This will include enabling infrastructure, asset ownership, and first-dozen-of-a-kind. Many vendors in Canada are small or medium sized businesses. Building one SMR will not be enough to sustain the cash flow of these companies. Furthermore, if the

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

customer does not want to own the product, it's unclear whether utilities will want to retain ownership and operation of the SMR.

- Industry capacity and national economic benefits are another key element. This element should be focused on technology and design as well as localization and procurement. While Canada has many technologies coming forward, the reality is that the supply chain and regulators do not have the capacity to support multiple reactor technologies. This suggests that a down selection process is necessary.

The 5th strategic energy plan of Japan was issued. This energy plan is not only for nuclear, but for all energy resources including renewables. This plan shows some challenges over the next several decades regarding energy as well as some possible direction to solve these issues.

- Japan will face structural problems in the next several decades involving vulnerability, energy demand structure, resource prices, CO2, and gas emissions.
- Japan will face changes in energy-related environments. There will be competition in de-carbonization technology and competition among nations and companies. Along with these changes, there will be geopolitical risks.
- To solve these challenges, Japan hopes to pursue an optimum energy mixture that should involve energy efficiency, zero-emission power sources, energy derived CO2, emissions, electricity costs, and energy self-sufficiency ratio.

Nuclear is an important base load power source that can contribute to stabilizing the energy supply-demand structure in the long term.

- Japan has two main tracks of advanced reactor programs. The first is to maintain and to improve fast reactor technologies. There are four elements to this track, including a knowledge database, experimental facilities, tools for common R&D items, and elemental technology for safety improvement.
- The second track is the Nuclear Innovation Program (NExIP). This is a private sector led system and technology development for advanced reactors. One element is to resolve social issues and needs for safety, harmonization with renewables, and applications beyond power generation, such as H2 generation.
- Japan has international collaborations with France and the US. With the US, Japan is cooperating on the VTR. With France, Japan is cooperation on fundamental R&D and past-SFR experiences.

The NExIP program has several aspects to consider.

- One aspect is policy and vision. Under this element, the government provides a roadmap of direction and objectives of nuclear R&D. The results of the NExIP program will be available in the coming month.
- Another aspect is R&D infrastructure. Japan will be cooperating with the private sector by utilizing its national labs to provide support.
- Another aspect is market oriented selection, which will involve participation of users and investors from the early stages of the project.
- Another aspect is the interaction with regulatory bodies. A review scheme needs to be developed even in the early stage.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

An important consideration to advanced reactors is the supply chain.

- The first point is the whole system supplier. This role can be done by heavy industry, state owned enterprises or inventors. They will need top sales, and may require government support on exports.
- The next point to consider is the components supplier. This role can be filled by small to large scale manufacturing industries with the potential of ventures in their respective specialty fields.
- Heavy industries, SMR inventors, and potentially international entities can fulfill the role of structural and system design suppliers.
- Human resources, fuel supply, and maintenance and operation are other points to consider in the supply chain of advanced reactors.

There are some questions to consider regarding SMR economic competitiveness.

- The first consideration is the learning effects on SMR innovative nuclear systems. LWR-based SMR can be expected partially.
- Regarding the cost of the SMR system, the discussions seem to be focused on the capital cost, but considerations should be given towards the fuel cycle cost and the maintenance and operation costs.

QUESTION & ANSWER

Q: *Are banks in Canada willing to finance projects of this kind?*

A: The early indications are that there is private sector money that's prepared to go into this space. It typically comes down to who's sharing in the risk and who is actually receiving the financing to make this happen. We have one very large nuclear utility, Ontario Power Generation, and a question is whether OPG is willing to be an operator of off-grid markets and if they will seek financing. There is also a question of whether there are federal backstocks that can be used to finance given the story of helping the indigenous communities. Early indications are that there is money out there, but it sits in a larger framework, and that larger framework needs expansion.

Q: *Because the provincial governments drive this, are they willing to create something like bonds to create capital?*

A: I don't know.

A: I'd stay tuned for New Brunswick and New Brunswick Power. They have two development agreements with Moltex and ARC. There's funding and they're looking at this as power for the province as well as establishing a center for power and excellence.

A: If it's an on grid market, it's within the space of utilities, but if it's in non traditional markets such as off grid or mining communities, raising money is not beyond their capabilities.

A: Mining communities were saying that they just want to buy the power at a certain price. The key for Canada is that once you've done it, and people are confident that it works, the money will come to play. There's a huge source of money in Canada that can be unlocked, but not for the first unit. In Canada, there are sources of funds that can be powerful once you get over the hump. It's government money that's paying for the fuel in diesel generators already, so you can just take all that money and repurpose it into a PPA.

Q: *Do you have any number for how much electricity is generated in off grid areas and the cost of this electricity?*

A: The total need for Northern communities is less than 3 GW. The current LCOE is 30-80 cents / kwh. It depends on where the mine is.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

A: The cost can be higher than that as well depending on the season and other factors.
A: They also have to deal with the transportation costs of getting the diesel up there. Some mining communities are accessible by sea, so that offers another transportation route. These Canadian communities are not too different from the needs of the developing world. Perhaps Canada can be a good model for this.
A: There is a bigger cushion on Canada than in the US. If all you have to do is beat the alternative, and you can do it with FOAK, you can be beating all along the way as you get to NOAK.
A: That's why I think these new markets are so interesting in the Canadian context. The simple reality is that you can't beat natural gas. The cost of the energy for powering the extraction systems is on the order of 5-6 cents/kwh. You can't get there with nuclear. On the Canadian road map, we like to talk about the oil sands, but the economics will not work in the near term.

Q: *What about public acceptance? Are they willing to accept nuclear power?*
A: We've had some preliminary engagement through the roadmap work, and with our indigenous communities, we have mixed responses. Many indigenous nations have developed an indigenous economic capability. Delivering energy to their nation is important, but they want an equity share in the business. There is early indication that there would be enough interest to make this work, but the clear message is that they don't want the first one in their backyard.

C: *You can't talk to indigenous communities about PSA values. It's a different problem set that we have to be cognizant on because it's a different value proposition than putting an SMR in Ottawa.*

C: *None of this will work unless the NRA changes its view on risk informed regulation. To me, you'd almost have to start by forcing a change on the regulatory side. The private sector will not invest until the regulator makes a move. I hope that the existing industry will push back. What you're proposing is very good, but the regulatory interaction will be the problem.*

Q: *The Japan industry is not interested in foreign SMR markets. Are there any plans to develop this idea?*
A: It depends on the company, but in general, they should have this kind of point of view.

Q: *I think NExIP program is a program to gain government support. Is there any private company that is participating in the NExIP program right now?*
A: There are many companies involved.

Q: *Are these utilities or vendors?*
A: Vendors.

Q: *What is their motivation to participate in NExIP?*
A: I cannot say. Some are focusing on uses in Japan, some are focusing on alternative applications of nuclear.

Q*: According to the NExIP program, do private companies have to invest their own money?*
A: Yes.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Q: *Is it 50/50?*
A: The government supports part of the company's technology development.

Q: *How do you see the market oriented selection process running? What is the interface between the policy envisioned by the government and the selection process?*
A: It's kind of a recommendation or a review process. The private sector wishes to have some idea for innovation, but if they want to continue their program beyond 5-10 years, they have to find a real market. The users and investors can contribute their ideas to help private companies find a direction.

Q*: Is it mainly about orienting investment? Is there a link between policy and the investment that will result in a more strategic direction?*
A: In order to get some financial support from the government, the policy objectives need to be followed. The applicant can select which objectives they are fulfilling under the policy direction.

Q: *I think this engagement first strategy is important, but I don't know how you'll go about it. If you have any insights, I think it'll be useful to hear. I think leaving it to the end is a big mistake.*
A: If I had the answer to that question, I'd be a very rich person. We've repeatedly learned the lesson of trying to engage after everything else had been done, so we're trying to change things. We have been engaging with communities to develop a repository, and through this process we have learned a number of things that can be applied to engaging with communities on SMR deployment.
A: One of the things we've done with the SMR roadmap is the regulatory engagement with communities to ensure communities that there is a regulator that will review and ensure the safety of anything that is licensed.

C: *I really feel estranged from Japan in my work. I have been really trying to figure out how to get a better coupling between the US communities at large and Japan. I want to offer as an issue to give some thought to as to how to reengage the US and Japan not just in the technical side. The technical part is very solid. The policy context and dialogue at multiple levels is not as developed as it once was, and it has kind of dissolved. I think it needs to be rematerialized. I'd like to find a way to rebuild that relationship.*

C: *You can't make a market without regulatory certainty. That's the problem that Japan has. They don't have regulatory certainty.*

Q: *Can applicants be international? You said the application should be in line with policy goals. How do you determine whether an application is innovative? You also said market oriented review system will be established. What new review system will be established? Will it be independent or engaged with the public?*
A: The NExIP program leader should be a Japanese company. Applicants make suggestions on specific technologies. The review committee is not yet established, but the idea is to make a committee. Committee members should involve the nuclear community, financial community, and legal community.

C: *Just thinking about innovation and moving to the next generation of technologies, I think of the collection of four countries represented here, Japan is uniquely positioned to provide experience. Canada has not exported anything recently, Korea's exports have followed the model of the UAE, but with Japan's relationship with Lithuania and other countries, there are three different models with other countries. Unfortunately, none* of

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

those have succeeded, but I think there are a lot of lessons learned that can come out of that to inform others. If we're talking about moving technologies into the developing world, you have a lot of data points from large reactors that can be applied to the new generation of reactors. Maybe we can take those lessons learned and get a little more comfortable going into markets and feeling a chance of possible success. I think in particular, the acquisition of Westinghouse by Brookfield makes people think Brookfield should be doing more in the nuclear industry. But Brookfield is being understandably cautious.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Session 6: Forming a Coalition of the Willing

ABSTRACT

Can a "Coalition of the Willing" develop a new approach or methodology for deploying SMRs/ARs in new nuclear power countries without compromising the pillars of safety, security, and safeguards/non-proliferation? What are the foundations and central points upon which such a coalition can be established?

SPEAKERS

- Paul Murphy, President, Murphy Energy & Infrastructure Consulting
- Nobuo Tanaka, President, Sasakawa Peace Foundation; former Executive Director, International Energy Agency (IEA)

SUMMARY

There is an importance of establishing multilateral support to build a new paradigm to address the new nuclear technologies, and it should be focused on prudent industry practice. The IAEA is too slow, contains too many anti-nuclear elements, and it involves Russia and China. A need for the multilateral support is largely based on the importance of speeding up the deployment of ARs and SMRs.

- In order for ARs and SMRs to hit the 2030-2035 window for commercial operation of projects, action needs to be taken now. A project-focused mentality is needed, and nuclear programs will take time to put in place.
- Emerging markets may not be able to obtain the regulatory experience and standards to be able to create an indigenous regulatory body. Multilateral support may be able to contribute to a regional regulatory body that can work with emerging markets to help establish a regulatory infrastructure for emerging markets in developing countries.

To establish multilateral support, some first steps need to be taken.

- Canada, Japan, Korea, and the US can begin to form a multilateral coalition with potential additions of UK, France, Argentina, KSA, possibly UAE, and possibly India. It would be easier to start with a smaller group and then add on support rather than to create a larger multilateral coalition to begin with.
- Key elements for this coalition include funding, designation of experts, and development of alternative guidance between the two extremes of large reactors and small reactors.
- There are some considerations to the products that will come out of this coalition. Steps need to be envisioned including what, how and who would be involved, and templates can be created for countries to use to streamline processes.
- Once the first steps have been completed, and a coalition has been established, the second wave will include a number of additions to the coalition, including client countries, NGOs, financing entities, industries, industry organizations, reactor vendors, and EPC contractors.
- Some considerations to make include the involvement of IAEA, NEA, and Russia and China.

There are important discussion points that can be raised by the idea of a multilateral coalition.

- The goal of this coalition is to ensure safe, secure, and safeguarded deployment on a volume basis.
- There are some potential obstacles that may need to be overcome. Speed is an important point, as moving too quickly or too slowly can be problematic. Lack of funding could be an issue.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

- Speeding up the current processes are necessary, but safety, security, and safeguards cannot be compromised. Historical assumptions may need to be challenged as a part of streamlining the processes.

QUESTION & ANSWER

Q: *Can we compete with Russia and China while developing new technologies and paradigms with the SMR? The IAEA should be involved as the new technologies and paradigms should be proliferation resistant models for nuclear power. Can we find answers quickly enough to challenge Russia and China?*

A: I think if you put enough resources into this, I think it can be done. It's important to clarify that we are not trying to freeze out the IAEA, but that independent actions need to be taken to speed up the processes that IAEA typically does not handle quickly. I think part of the idea here is to create a better pathway, because right now Russia and China make it hard to compete. There are places in the world where we can't win. I think there are a lot of reasons as to where we can collectively compete, but I think the current systems and rules make it difficult to match what China and Russia are offering. Reputationally, Korea EXIM and US EXIM provided financing. Having the US as a third party in the Saudi deal created a strong value, but in order to realize this reputational value, you have to put a deal on the table with a good value.

Q: *You started your talk by asking if we could have a regional regulator. You can't have a regional regulator because of sovereign obligations, but you can have a regional TSO. In Korea they have KINS, and other countries use TSOs. If countries in the same region are deploying similar technologies it makes the argument for regional TSOs stronger.*

A: One of the problems is getting the expertise in these countries to let them do what they need to do. Look at West Africa. They pool resources together to get a regional regulator that can be standardized among countries. Instead of each country having to fully staff something at the scale of FANR doesn't seem feasible either. Couldn't pooling resources make this easier?

A: You can still pool resources at a technical level. If they're buying a technology from a vendor country, that vendor country has licensed it. TSOs can be focused on site specific issues. Ultimately, the oversight of the operation and the commitment is sovereign. This is where I'm pushing back. I think you can go everywhere except for having a regional regulator driving the system.

Q: *Do you think there are enough people out there?*

A: Sure. I think as long as you set regulatory guidelines, then I think they should be able to do it.

C: *Proliferation-free needs a fuel return program. Proliferation resistance is in the eye of the beholder.*

Q: *One of the things I've wondered is the issue of involving Russia and China. It was my understanding is that almost all the countries they're moving forward with are going through the IAEA milestones, and they're at least in phase 1 or 2. I'm wondering if we're using the IAEA as the only model when there are other options to look at to meet these milestones. Is the better conversation not to walking away from a milestones approach, but to see how we can streamline that approach using our resources?*

A: One option is to provide funding and regulatory guidelines on how they can do this faster. Where the process is broken down is that countries are left to their own devices. If they have the benefit of outside advice, they can save a lot of time. I'm putting a lot of emphasis on time. I'm not saying we should forgo the milestones.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

The principles of the milestones are hard to get away from. If we want to do something faster, how can we take what's out there to fill the gaps?
A: I think there's a more graded approach by using the milestones. The research reactor rubric is just too different for us to adapt and modify that.

Q: *I think one thing I've heard is that there is a need to produce documentation that's more tailored and accessible to the needs of developing countries. I might have also heard the need for a handholding capability that could help nations with the journey. Is it either of these or both of these? If it's the first, it seems to me that it's a time limited effort. Could you clarify this a bit? How much of what I talked about is in the vision?*
A: It's all of the above. I think you're creating some new pathway in the existing pathway that's more tailored to SMRs. Having somebody or a collective vet engineering, legal, or construction firms that know their stuff would be a great benefit, as currently the IAEA does not tell you anything. If it's a collective multilateral effort where we set up a bunch of criteria for someone to become a certified advisor, it would be powerful. Having the tools is another aspect. Why does Tanzania need to redraft contracts, feasibility studies, and siting procedures from scratch? Nobody is saying they need to take it without modification, but it saves time and resources for developing countries to give them a template to modify for their own specific needs. They get so bogged down in a lot of these things that maybe they can't afford it. They're not to be skipping things they need to do; we're just helping them complete what would take four years in two years. Maybe there are some things we cannot fast track, but looking at it and identifying what can be fast tracked can be helpful.

Q: *Is the Korean approach to SMART with Saudi Arabia an example of what you're talking about?*
A: If Kuwait called up and said they wanted a SMART reactor for power and desalination, Kuwait still has a lot of stuff they have to do. The focus would be on what Kuwait needs to do to take a Saudi and Korean joint reactor into their country. They still have to go through the whole processes, and they have to take responsibility for the nuclear program in their country. Yes, there can be training programs, but that's one piece of it. Training programs don't have to be with KAERI and KACARE. It could be general training programs in Japan or the US. Some will have to be technology specific, but there are different levels.

Q: *In Canada, we have the roadmap. From this roadmap we have an understanding of the domestic framework. For the international market, there was acknowledgement for the need for a framework. I think there's work that can be done collaboratively on this, but starting from a stage where we don't want to rush to a model. I've had some questions around whether we're talking about an alternate model or different pathways. Are there potentially different pathways that can end in different deployment scenarios regarding the complexity, scale, off grid/ on grid nature of the reactor? It seems like there's a spectrum of different possibilities here. It seems like different models like a graded approach scale differently based on complexity. Does it make sense that the level of differentiation from the milestones approach is based on the complexity of the technology? Can we pull anything from other global industries that can help us form an international framework? In terms of your next steps, it seems like there's quite a bit of work to explore these dimensions. Rather than jumping to writing technical documentations, I think thinking about what the different options might mean makes a lot of sense.*
A: I agree with everything you're saying, and I think this is going to be really hard. It's going to have a lot of different people that are thinking of all these steps. What I worry about is if you meet at a conference every 6 months, and people show up with their own papers, and this is repeated, it will not get anywhere because it's so complicated. I think you need people working on this full time. I think you need to empower people.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Countries that will fund this program need to draw the frame and set the targets. They need people who know what they're talking about to do this as a full time job. Could there be different scenarios for different applications? Of course, and we need people to be investigating this beyond just presenting a slide deck every 6 months. If we don't empower this type of focus, I think by the time this is all realized, it will be too late for SMRs.

Q: *The regulatory document we were talking about is to take what we have and pulling out what we think will be relevant to SMRs and ARs. Maybe we can take that out and determine what the sovereignty issues are. The graded approach is what we really have to look at. There's a wide range of what you're looking at, and from the regulatory perspective, how you want to look at that is where the graded approach comes in. Regarding support for emerging markets and developing countries, a lot of them are asking for advice.*
A: I think that's a huge point. There is a sense of zero-sum discussions where the project company and the vendor are trying to compromise something for the bottom line. There is nobody who can help when everyone has a dog in the fight. Even just having an objective advisor could save large amounts of resources and time. That can be a huge role can be filled by the idea of regional regulators.

C: *You put forward a dramatic and radical idea that will break China. Breaking China always engenders opposition. Anything that is new that will intrude in the current plasma will create a mark and generate a reaction. I think that's ok, and that's part of the process. I think one thing to keep in mind is that we have to see the big picture. This idea is worthy of consideration because we need to address the high level issues of climate change. These are hugely important issues that will affect developing worlds more than developed worlds. We need to understand that at this particular moment, the clay is soft. You can mold something new, but in five years, it will harden and change will be difficult. As excellent an institution the IAEA is, they are a graveyard for creative ideas. Their organization is full of sovereign individuals with different goals. If you take these high level issues, I think we need to give OECD countries a leg up on a severely tilted playing field whether it's existing LWRs, SMRs or ARs. I think we need to consider the price of inaction when we discuss the details.*

C: *If you are looking at the newcomer markets, they will ask you to have a demonstration project first. The international coalition's easiest task can be to jointly fund a demonstration project. These markets are also likely looking for fuel assurance. There is a need for uranium and fuel enrichment partners. Potentially this can come from URENCO or the French. I think fuel assurance is an important consideration. Regulatory uncertainty is a critical part. Even among OECD countries this is the biggest obstacle. I think if it's only a small number of countries developing similar countries for standardized designs, maybe the international coalition can create regulatory harmonization to make sure you have some certainty in ARs. I also encourage the involvement of security and nonproliferation partners from the beginning. Maybe the international coalition can develop a model for early engagement practices to help others develop a roadmap for how to best engage with their communities, especially with the introduction of new types of reactors.*

C: *I think the countries that comprise the core of this take a view that a small piece of the pie is better than no pie. If the first reactor under this system is a SMART reactor for Kuwait, it's still a win for everyone. Even though we want our own designs to win, even this small progress is a win for everyone. Maybe there are ways to collaborate within a deal to provide every participant with some benefit, but we should not see this as a collaborative effort where only one party wins. Sacrificing a bit to win more in the long run could be beneficial.*

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

C: *Korea has experience in developing countries. Exporting nuclear systems are not as simple as exporting a single product. The exporting country is expected to also provide services including education. This is a very interactive process. We should keep this in mind. We cannot escape politics, as nuclear is deeply related to politics. Geopolitical issues and regimes should be considered. Using nuclear power has a very high entrance barrier, so we should find out how to lower the barrier without sacrificing security, safety, and safeguards. There is no simple solution, but I think if we introduce some international infrastructure to manage spent fuel issues or international fuel banks, infrastructures in smaller countries will benefit as they cannot solve these issues themselves.*

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Luncheon Address – Rita Baranwal

ABSTRACT

The industry is at a crucial point. The need is great, but the time window is short. DOE has a number of priorities including accident tolerant fuels, demonstration of AR technology by 2025, and enhancing global competitiveness. No one company will be able to meet the 2025 date, and consortiums will need to be formed faster to meet this goal. DOE hopes that recycling and reusing fuel will be an area of further investigation.

SPEAKERS

- Rita Baranwal, Assistant Secretary of Energy for Nuclear Energy, U.S. Department of Energy

SUMMARY

The industry is at a crucial point. The need is great, but the time window is short. DOE has a number of priorities.

- The first priority is to develop and create an infrastructure for accident tolerant fuels.
- The second priority is to demonstrate an AR technology by 2025. This time is consistent with legislation in the US, suggesting that there will be demand by then. This will also force current technology plans to be accelerated, as it is faster than NuScale's timeline and VTR's timeline.
- The third priority is enhancing global competitiveness. This requires a cradle-to-grave fuel takeback and financing option. This is something the US cannot offer, but Russia is offering this package.

No one company will be able to meet the 2025 date. There will need to be cooperation or possibly groups being formed among industry. Consortiums need to be formed faster to meet this goal.

- There are a wide variety of technology and sizes, but DOE's agenda is not to down select. At the moment, DOE is still investing R&D money into all three classes of ARs: HTGRs, Fast reactors, and Molten Salt Reactors.

There are a number of states, developing countries and emerging markets looking to meet technology and energy goals. Changing the public perception and how nuclear energy is valued is a key aspect to meeting these goals.

- Nuclear is typically a long term project, but investors are looking for very short one-year returns on investments.
- DOE is looking to industry to help provide this change in public perception.

There are four major facets to talk about when trying to sell commercial nuclear energy. Collaboration will be needed.

- The collaboration between CNSC and NRC is a big step forward towards progress.

DOE hopes that recycling and reusing fuel will be a subject of further investigation. Storage issues can be mitigated with back end considerations to fuel.

- Uranium is not a renewable resources, and fuel may not always be cheap. Exploring back end options may prove to be valuable when this time comes.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

QUESTION & ANSWER

Q: *My position on nonproliferation is to rethink the orthodoxy. My position is to think about what we need. That being said, I think there is adequately funded and very vocal set of opponents to recycling with the focus on why the plutonium is needed. I don't think there's yet a consensus on advanced reactors. From a media perspective, reporters are going to love nothing more than the David and Goliath story that nonproliferators are putting forward.*

A: I say bring it on. That's not a reason for me not to pull that thread.

A: The bigger issue to me on nonproliferation is that the reality is moving nuclear power out to developing countries. Fuel return will be a big part of this. Kuwaitis pulled away from the GNEP program because it went from being a fuel takeback offer to an infrastructure initiative. The number one proliferation issue will be fuel services. Given the fact that the IAEA conducts 52 special inspections a year at the Rokkasho facility, I don't think material accounting in established nations is an issue. If I could redo the NPT, I would write in a clause that forces P5 nations to offer fuel takeback services.

A: Let's not dump it in a hole and never look at it again. Let's not spend money on something like Yucca Mountain because then you're cutting off options.

A: You're correct. Interim storage is still on the table. It's not all or nothing.

A: If there's money for technology to separate the spent fuel, then that's where I think you'll really go to war. If there's a decision to resurrect separation technology outside of what's happening at Idaho, I think you'll have a serious problem on your hand. But the way you're characterizing it, I think that's reasonable and people will have a reaction, but it won't be overwhelming.

A: It's a lot harder of an issue regarding takeback. It's one thing for the Russian government to take back fuel, but if I'm Westinghouse or NuScale, where would that fuel go? How would I find a place for it? It would be just as hard, if not harder, than the Yucca Mountain project.

A: I think we've only done it under national security reasons.

A: If the Russians are going into countries and saying that they're willing to offer the take back services, that's an issue. They even have floating plants that they can just plug in to provide power. The competition is finding creative solutions to beat us out. They're going to countries to help them solve their problems. We just don't have a story to tell.

C: *The US is the only country with a law that allows us to take foreign fuel and dispose of it here. There was an amendment that was made that makes the president have to decide how to dispose of the fuel before it is taken in. That is such an insurmountable hurdle.*

Q: *I'm not against the idea of having R&D investigate back end recycling. If it's a policy to encourage reprocessing, that's another thing. Even under GNEP, the Bush administration wants to pursue recycling, but not other countries. How are you going to convince other people if you are going to do it? My question is, is this the DOE's policy now to encourage recycling in other countries?*

A: No.

Q: *So what you're saying is that the recycling technology should be retained within the US, right?*

A: Yes. I am merely saying that I just want to revisit and explore this possibility of the US retaining this recycling option. France offers recycling options, and they have not run into any problems of diverted materials.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

A: It's not clear that any country has lost materials. Some countries like India have used it, but nobody has lost materials. There's some suspicion cloud that comes with the idea of reprocessing fuel that can be used to make weapons.

Q: *Building on the idea of demonstration by 2025, you have Alaska and Puerto Rico. In the same spirit of the bilateral cooperation of NRC and CNSC, maybe it's worth considering whether a demonstration at a national lab site would be suitable? Maybe this is about accelerating demonstrations cooperatively. In terms of going faster, maybe there's an opportunity to send a very constructive signal to explore this idea.*
A: One thing that you all have that we don't have in the US is utility and user buy in. We have not yet gotten that.
A: It has necessary first wave buy in, but when it comes to mining and northern communities, the water is still warm. I guess it comes back to which market we are targeting.
A: NRIC was just announced at INL a couple weeks ago, so that's essentially what you're talking about. The thought will be that companies can come and site their demonstration at INL should they want to demonstrate it in the US. That being said, many in that community went to Canada for that reason: the markets, the phased regulatory approach, etc. We are collaborating to the extent possible, but frankly, I think you guys in Canada are leading the way in that.

Q: *I am promoting the integral fast reactor for years in Japan, and finally, METI is agreeing to join the VTR in the US. That is a great success story for us at the moment. The purpose of the IFR in Japan is to separate plutonium from the debris in Fukushima. Pyroprocessing can be used to clean up ruins of a decommissioned reactor. At the same time, if it's successfully proven in Fukushima, it can be used elsewhere for spent fuel reprocessing. I am also supporting the idea of burning plutonium from North Korea. This is the kind of joint project that Japan and South Korea can work on. We can share the burden to denuclearize North Korea. North Korea's stockpile is only 47 kilograms, while Japan has 40 some tons. Do you support this idea as a proliferation resistant technology option? Korea is already doing work with the US in pyroprocessing with the goal of a demonstration by 2020.*
A: I can't commit to anything. But it is certainly something to think about.

Q: *Who do you see as other logical partners to grow in this international collaboration of SMRs other than Japan, US, and Korea?*
A: My initial thoughts are that the UK has a lot of experience that they can bring to the table. If you're talking about countries that are looking towards this space, there are African countries such as Kenya and Ghana. We need to be talking to them more. There's just an absence of people coming to these people and telling them what their options are. This seems like a pretty simple thing to do, but we're not really doing that. I think India should also be at this discussion, despite some political issues. Middle East countries could also be included. Those are at the top of my mind.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Session 7: Developing New Frameworks

ABSTRACT

When developing new frameworks, there are a number of things to consider such as Prospects for international harmonization of standards for SMRs/ARs, considerations for new standards and models for SMR/AR deployment in newcomer countries, applicability of IAEA research reactor processes to commercial SMR/AR deployments, lessons learned from other sectors/industries, creative approaches to safeguards and security, and steps/conditions required for creating a Coalition of the Willing

SPEAKERS

- Paul Dickman, Senior Policy Fellow, Argonne National Laboratory
- Edward Kee, Founder and Principal Consultant, Nuclear Economics Consulting Group (NECG)
- Phyllis Yoshida, Senior Fellow for Energy and Technology, Sasakawa Peace Foundation USA
- Carol Berrigan, Senior Director of Supplier Policy and Programs, Nuclear Energy Institute (NEI)

SUMMARY

There are pieces that exist that could be informative among other global industries that can be applied to the nuclear industry.

- Smaller multilateral cooperation will be more effective than trying to form very large multilateral organizations. The four governments represented here are probably big enough already.

The discussions around the need for a demonstration are critical in this space. Demonstrations are very critical to enabling the deployment of SMR technologies and creating a commercial demand.

- Having operational experience to help customers operate and develop resources to manage their nuclear technologies will be an important part of exports.

The IAEA milestones approach is an accepted model. On face value, it does not appear to have any significant flaws. While trying to streamline the process, it would not be prudent to argue that any aspects of the milestones are not necessary or significant. It will take creative approaches to identify discreet areas where tools and models can be created to shorten the time frames.

- The role of government should be considered when thinking about a multilateral coalition. There may also be roles of NGOs in this international effort. Bringing NGO members into this dialogue will be valuable, as they can offer insight.
- Engaging other platforms that exist may be a more efficient method than creating platforms from scratch. It seems as though there are a lot of target countries looking to address the milestones, so countries and organizations may be able to come together to look at existing tools under milestones to identify what modifications can be made.
- Outside of the milestone development, there are opportunities to collaborate on export financing. Should we take a fresh look at the nuclear sector under the OECD? Should we also look at the World Bank policy in nuclear as a collaborative engagement? Are there other tools that we can work on together that will allow greater access to capital on the scale that SMRs and microreactors will find useful? Collaboration should be considered broadly.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

- Whatever the coalition takes on, it would be crucial to focus on the end goals and make sure that efforts are being taken to meet the end goals in the time frame.
- Engagement with global conventions is another important consideration. As safeguards are looked at, there will be international conventions to think about. Frameworks and existing conventions should be considered as a way to utilize existing tools.
- There's a reliance on vendors and private companies to develop designs and produce demonstrations, but those companies are not represented here. There are only so many billionaires that will fund these types of projects. There must be some role for government to help these things get done more than just providing a site such as Chalk River or Idaho National lab. They will need some financial support in controlling the risk they will face by developing a FOAK technology, whether it's a PPA or something else. The new UK regulated asset based approach talks about how to handle this completion risk in the UK. We could take similarities and apply it to our countries.

QUESTION & ANSWER

C: *How do we cooperate with the Koreans on SMART to help us develop our own indigenous designs like NuScale? Doosan is cooperating with NuScale, and that's a good idea. The supply chain may be a way to make that intergovernmental cooperation work. If we all have a piece of one of those projects, it makes it easier for governments to come together to fund projects.*

C: *The electricity industry reform and restructuring makes all of these efforts easier. They want you to bring operators, ownership, and financing all to the table before the project is considered. Getting a private company to do all this is going to be very hard. Government may need to help in this process by taking part in some equity or something like that. If we don't do this, China will definitely do this and beat out the competition. Looking at the electricity industry issues around these projects, Ontario is a good model. The Japanese electricity reforms have created a much more gradual approach to keep nuclear viable in the mix. The Korean deal with the UAE is not that different from Westinghouse's deal with China. Essentially they traded the risk sharing for IP rights. We need to find a way to cooperate multilaterally but also within our private sectors to help companies get off the ground.*

A: There's such an inventory of horror stories and successes over the last 60 years with larger reactors that can be applied for SMRs. The question for this group is how can this group of countries work together to provide financial and other types of assistance to companies.

C: *The MoC with NRC and CNSC will be a great framework moving forward. Hiring people full time to investigate this rather than just sharing notes every few months will produce much more significant results. Countries have to define the goals and supervise and review it. You also have to empower people to do this job. Whatever is decided as the path to go forward, all the existing organizations should be a part of it. Keep the Russians and the Chinese distant, but then bring them in eventually.*

C*: It's going to be very hard for us to look at the milestones and what we can use to phase them without having a lot of operating experience with these SMRs. We need to know exactly how different these technologies are to know where we can streamline.*

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

C: *I was in a meeting about a year ago to brainstorm policies. Someone threw out an idea of creating a independent nonprofit firm to consult and provide a suite of options for new countries. All the countries have similar problems in exporting.*

A: There was a proposal for the US Labs to perform this type of work, but it never got off the ground.

A: I think that gets to the core issues. None of the technologies have been commercialized yet. This type of investment is prohibitive for many. There is a role for greater dialogue and understanding. It would be worthwhile to look at the piecemeal efforts happening in other countries rather than to reinvent the wheel.

C: *I need to understand better why the design for the LWR is applicable to a class of reactors that doesn't exist yet. Why is the alternative to that a threat, when the goal is the same.*

A: I don't think it's an imperative issue. We have this standard where IAEA goes to inspect based off the 19 milestones.

A: Do I think the milestones IAEA developed are perfect? No. But it's an established standard that makes sense. Maybe your implementation for an SMR or AR looks different than a LWR program.

A: KAERI is helping client countries develop 19 milestones because newcomer countries cannot tackle the 19 milestones all on their own.

A: There is not question that the milestone items are important. I think that's in agreement. I think that the KAERI approach which is to provide the ability for the recipient country to do this on their own is good, but it is limited by human resources. They do not have the capacity to do this for 15 different countries at the same time.

A: I think the idea of a graded approach is a great issue, but we need to remember the paradigm shifts that were mentioned. If this is successful we'll have hundreds of reactors in hundreds of markets. You may not be selling to a government or a country. You may be selling to a privately owned industrial site.

A: That's where I was trying to with setting up models based on the milestones approach that is appropriate for SMRs. You can check the boxes but develop a model that's more appropriate for the scale for SMRs. How can we satisfy all these milestones differently?

A: What do you mean by graded implementation? Is it like A, B, C, D, or is it more based on a grade? There's no penalty to not following the milestones.

A: Here's the problem. Banks looked at us and asked if it complies. If none of these are legally binding, you don't have to do any of them, but once you need to get financing, having something to benchmark off of to say that you did this is an elevated burden of proof when you're dealing with bankers. While these things are all out there in some fashion, it was never used as a checklist that was used to rate the worthiness of a project. Maybe previously projects stumbled into the milestones, but they didn't complete this to the full extent.

A: For a particular SMR or AR technology, it may be a small size, so maybe the grid size doesn't matter as much. Maybe it's not so expensive so funding won't be as big an issue. The impact of these milestones are all minimized by features of the technology. Some models like the BOO model makes some of these milestones completely irrelevant.

A: So are we racing to rigidity to the way things were done in the past?

A: Let's think about a more tailored application of these milestones for newcomer countries because they don't need to worry about these things as much as they would if they are making a GW size plant.

A: We can run through scenarios and build these based on the proposals that we've been seeing. We can use a graded approach or a risk informed approach.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Q: *I think there's also a question about whether the country where the technology being deployed is going to be responsible for the technology or if it will be another entity?*
A: The way it works right now is, because the IAEA is a governmental organization, it is the government working with the IAEA to respond to this. Their response may be that they are working with a certain organization like KAERI or a university to fulfill certain pieces of the milestones, but at the end of the day, the government communicates to the IAEA.

Q: *Is that a precondition? Do you need to have a national government that signs off on this?*
A: Utilities are private companies, but they're licensees. This goes back to a regulatory framework. This is why at the end of the day, the regulatory framework has to be sovereign.
A: This also gets you to the issue of international conventions because those are all at the national level.

C: *One thing to remember is that getting into discussion about the IAEA is that everything being said is correct. But at the end of the day, there's also a project. If we're going to help countries, one area we can add value is helping them get a project done. The collective experiences of the countries here, both good and bad, can be used as lessons learned for newcomer countries.*

C: *If the goal is to compete against Russia and China's state owned nuclear vendors, why don't we learn the lesson from the Airbus industry? I think it makes sense to think more about the international consortiums against Russia and China. If we have to combine all the resources and coordinate government policy, maybe we can compete. Maybe it's time to think about these ideas.*
A: What about the difference between export control regimes in the countries represented here? Unfortunately, without a 123 agreement, the US can't sell anything.
A: I'm talking about international collaboration. If this is an industrial scale problem, maybe we need to collaborate on a global industrial level.
A: But there aren't many designs we can do this with.
A: I think that's the problem with the nuclear industry. It makes sense that we can't have too many vendors in this global industry.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Session 8: Where Do We Go From Here?

ABSTRACT

What are the approximate timeframes for some of the proposals and recommendations given during this meeting? What are the likely areas for multilateral coordination and cooperation in SMRs and ARs? What multilateral collaborations would be critical to ensuring facilitated deployment and commercialization of SMRs and ARs? What should be the elements of a broader and coordinated multinational strategy with respect to engagement with nuclear newcomer countries, industry alignment and integration, etc.?

SPEAKERS

- Kenneth Luongo, President, Partnership for Global Security (PGS)
- Edward Kee, Founder and Principal Consultant, Nuclear Economics Consulting Group (NECG)
- Paul Murphy, President, Murphy Energy & Infrastructure Consulting

SUMMARY

There are a number of objectives and needs for the establishment of a multilateral coalition to support the global deployment of SMR and AR technologies. A key element of a multilateral coalition should involve the creation of a resource center or a center of excellence for next generation small and advanced reactors (SMAR).

- This center should focus on building SMAR milestones for newcomer nations that fill the gap between the IAEA's LWR milestones and its guidance on research reactors.
- A list of endorsed organizations in participating countries that newcomer nations can work with in preparing for reactor deployment should be identified.
- Documents, contracts, and related items that an inexperienced nation can take off the shelf should be developed.
- Participating governments should coordinate to provide development funds to support the newcomer nation's payment for the services required to safely and securely deploy the reactor.
- Concrete data should be developed through market analysis to identify likely SMAR deploying nations and industrial users.
- There is a need to support high quality, multinational regulatory standards for SMAR that are developed by experienced nations and that can be transferred to the reactor recipient nations the basis for their regulatory system.
- Communications, engagement, consensus around the SMAR value proposition should be developed and strengthened among the coalition partners and stakeholders.

The coalition should begin with the initial group of four nations: the US, South Korea, Japan, and Canada. This coalition can be expanded to other developed and developing nations over time and in stages. Eventual inclusion or Russia, China, and IAEA should be considered.

- A team of experts to develop the content identified above of 20-30 multinational people should be created.
- GABI can serve as the convening organization secretariat.
- Subsequent management can be done by GNI+/PGS with substantive leaders.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

- Funding needs to be delivered from the governments present in the coalition. There is no foundation in America that can grasp this idea or even fund it. At some point, the newcomer countries that benefit from this may providing some funding.
- The initial timeline should be set at 18 months.

QUESTION & ANSWER

C: *It's important to start with just four countries so that trying to get majority agreement among too many countries does not slow the process down. As time goes on, and as new countries are added to the coalition, the process can evolve.*

Q: *Is this a push or a pull for these countries? Are we producing something that they recognizably need or want?*
A: Yes. We've spent a lot of time in IAEA sponsored training missions, and these things come up all the time. I think this is something they will really appreciate.

Q: *You need to get these countries to posit the question that encourages the government to do something about it.*
A: I think it's an answer to the question we've been grappling over the last two days.
A: I think at one level it's important, but in order for anyone in DOE or anyone in government to get involved, they're going to want to see that this is going to have some pull.
A: I'm not one to say whether it's enough pull for countries, but I can say that if you want to create some kind of vacuum that allows countries to feel more comfortable to think about this type of technology, this is an underpin in that effort. This is not a challenge to the IAEA. It's not against the IAEA, but we need complementary processes to what's going on.
A: There are also project design reactor development companies that will ask the question that nobody will buy this in the US, so they want to go into the export market. If we are talking about whether they can pay for this, they probably can't do that now.

Q: *I think that there are some very interesting ideas here. What is the plan for the written document?*
A: We have three different versions of this document. That can be put into three pages and circulated with no problem.

C: *The language around countering Russia and China is the subtext for the dialogue here, but I think it could be too strong to be appropriate for a public release. In terms of the work items and the model you proposed, I can take that back. In my own sense, there are a number of different ways to work this, but I think we can definitely have discussions to move this forward. In terms of the substance, it strikes me that there are two different tracks of activities here. One is in a policy/regulatory enabling framework space around the milestones to create a pathway to market, and the second one is almost a business development through a list of vendors. Track one is solidly in a government space, and track two may be in more of an industry space. I think there is a lot of work to be done among non-government actors to provide that evidence and insight. There may be an interest in governments to support that. In the second track, I think there's some role of government while mostly it will be in the industry side. I think there's room for partnerships and industries*.
A: I think that's a subject to be determined. GNI set the framework for how you would think about individual columns. There are plenty of people whether it's from prior government, lab, or IAEA experience that can help

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

inform how this will be put together. This isn't a laying down of an ironclad idea. It's more of an idea to enable more streamlined government interaction and cooperation. We're trying to provide a vision of an end goal and assistance to get there. Governments will drive this in collaboration with private sector, but there needs to be support for that.

A: When you get into the SMR and AR space as well as a developing country space, you have two unique problems. You have countries that don't have the money that they need to do the project and finance the reactor. There's this huge program development piece that is almost overwhelming to them from a lack of funds and experience. On the other side, you have the SMR and AR people that are living on ramen noodles and they don't have the money to travel all over the world to interact with these people. The people we need to have this happen with are not capable of doing all the things that need to be done. The idea is, with the four countries, that we all agree this is a problem that needs to be solved. If the people who need to solve it can't do it by themselves, you kind of have to step in and help them solve the problem.

A: We did a study on multilateral banks, and nobody is doing anything with nuclear. There is an opportunity for us to utilize these tools just as there were opportunities for technological innovation to allow us to break into these new markets.

C: *Safer implies that our existing reactors are not safe.*

A: There are newer designs that allow for a zero impact in the case of the accidents.

C*: I want to bring up the discussion of a product versus a service capability. When one brands us as the center of excellence, it provides a sense of endurance. One approach is to, rather than mixing these up, say that this is an 18 month project with a number of deliverables. Another perspective to think about is the communication around the commitment. You don't want to end up falling on your sword on that issue, so we need to think about public disclosure and the threat that brings on. Anticipating is a reality that we need to take into consideration.*

A: I think that will be part of the communication section.

Q: *Reactor certification is not really a regulatory standard. I think that could be more on the fuel qualification side. This is a significant leap, especially the words in the parenthetical statement.*

A: It's hard to harmonize except on the technical merits, and in that case it's the science. How you apply the science is social.

Q: *This is a combination of an international consulting firm to sell reactors plus a research think tank to make policy recommendations to the government. I'm not sure which type of organization you're thinking. Is this an independent organization or a collection of the people?*

A: The idea is that it will be individual experts influenced by suggests made by the individual countries. The idea will be to have the best people available. The first point you made is essentially the same point the Canadians made. I don't know you can tear these two apart, but they can be two pillars under an umbrella. It's not to be an advocacy group for sales.

A: I think the first objective is ok, but the problem is that if you try to achieve that goal, there are two things. The point I'm making is that selling particular reactors in particular countries is a business deal. Some of the things that you're talking about could be interpreted as helping companies.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

A: These markets are looking at private companies to come in and sell these things to bring business back home.

Q: *What is this center of excellece for?*
A: It's for newcomer countries.

Q: *For what?*
A: To help them handle the incoming reactor projects in their countries.
A: I think SMRs and ARs are one part of the picture to meet the objectives.
A: Using an example of country X. Let's say they're interested in getting into the business for economic reasons. We're saying that they can come to us and we can deliver something. What that something will be is what we're determining now. These countries don't know how to do siting. Those are neutral to technology. If you want to do a one-stop shop, you want to do feasibility. It's the feasibility of this country to even have reactors. Once you have the feasibility, the milestone process flows. From a product deliverable standpoint, I'm trying to figure out what we can offer, and I think that's a feasibility study that can help them go through the milestone process.
A: I'm seeing the list in section 2 as informing countries looking to develop ARs or SMRs or newcomer countries. There are some points here that Canada could be informed on. I'd like to see more analysis on what other models would look like.
A: I think you hit on a good point. You have two extremes. You have research reactors and milestones for LWRs. When the group starts making the graded approach between these two, on some of the 19 issues, some may be closer to larger reactors, while some may be closer to research reactors. It's not going to be a 50/50 split between the two. That's the goal of having experts look into this.
A: I think there are still some good questions. I don't know if the graded approach is the only way forward. I'd be interested in different models. Graded approach may be a good idea, but I'd like to be informed on what all our other options are. I think the feasibility assessment idea is a good product for newcomer countries. It mirrors the kind of engagement that we had with Northern communities. Maybe that's a better way to frame this. Maybe it's better to frame this as countries interested in deployment and newcomer countries. Maybe its also countries that have stakeholders within the countries that want to deploy technologies without having a nuclear sector in their country. What I'm trying to do is to understand a bit more about what the model is.

Q: *This organization would get funding for the government to discuss with the newcomer countries. Is this correct? Who would fabricate the component and the design? Who would construct this concept?*
A: We can have a membership council of participating countries to determine what this center of excellence will look like.
A: So if the four countries get together, these countries have their own companies. Which company will prepare the components and systems?
A: The idea is, if this is valuable and worthy of investment, we would have a kick off meeting. Before that you would deal with the questions of structure: who is in leadership, whos on the teams, what is the milestone process, what is the product that people want. This is not a self propelling jellyfish. It moves in the direction that the membership wants. This concept is being presented to four countries to inform on the value of what they're trying to accomplish. You have this kickoff meeting and then you provide time frames to do the work,

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

then you come back, and you discuss the products. Then you discuss and refine. When you come back at 18 months, you'll hopefully have something useful.

A: Part of the challenge is that this is not what this is saying. This is where the confusion lies. This is an enduring organization that can offer services to newcomer countries.

A: There will be tools available. One of the tools available is a list of lawyers, engineers, designers, etc. that are available for newcomer countries to look at to determine who to choose when developing their projects.

A: This reads like you're delivering a one-stop service. The fourth bullet seems to be the main contention. This could be a result of the 18-month deliverable. This doesn't have to be a government side activity. It could be completely done on the private sector side.

A: Identifying a list of endorsed organizations is something that I'm not sure why a government would fund. Broadening the milestones approach would be more acceptable, and I think the market analysis is definitely something that could create a pull for these technologies.

A: I think we have to guard against making this too much of a policy or academic exercise. Some of the 19 milestones are more on the policy side, but the end goal is to deploy technologies to provide electricity or steam for what countries need. This has to be about countries that are cold starting from nothing and getting nowhere. That I think at the end of the day is the tool to support the paradigm. For these countries, it's a big problem that they don't know who to hire. This is where it would be exceedingly sensitive, but if you had a list of service providers that countries could then look to then make their decision, it would be a great benefit.

A: The impression that I'm getting is there is a certain amount of public disclosure required. If we're promoting certain companies by putting them on a list, it may not be defensible. Maybe we have to think about when that comes. To this question, the point is not to lobby. We have different audiences that have different needs. It's clear what is useful to Canadians. Maybe we should what we want out of the first 18 months and what are the milestones and products. At the end of 18 months we can figure out what happens next. It's perfectly reasonable for any government to say, "let's see if it can work." I do think there's value in having this kind of support. We're not going to get to where everyone has said where they want to be.

A: A perfect example is the space program in the 60s. Kennedy made a goal, and people achieved that goal. This isn't that different if you think about it. We need to be deploying these reactors in the 2025-2035 range. At the end of the day, keeping it rather simple, what's been going on is not working. This has to be a results oriented exercise. If we need to get there by a certain time, we need to figure out what needs to change without compromising the core principles. If there's another idea out there, this is the perfect time to put that idea on the table. I don't think we can spend three years figuring out what we need to do. Something needs to be done pretty soon.

C: *What you're trying to do is get integrated policy. There's one thing that all four countries are interested in doing, which is deploying small reactors. That's one common bind. Beyond that, what are the mechanisms that we have to actually collaborate? US and Canada are much closer in many ways. There are vendors working in both the US and Canadian regulatory systems. It's much easier for US and Canada to collaborate on this than it would be for US and Japan or US and Korea. We have to go back and look at the fundamentals to see if we have the same objectives. We have this common objective of wanting to see deployment of SMR and ARs. Maybe what happens is that the US and Canada become the centerpiece and the Japanese and Koreans tack onto that.*

A: This is not a sales pitch. This is a concept that has been put together to advance what the people at this table want. I would like to know whether this is on the table or off the table.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

C: *One important point I saw was the access to capital, and the other is the demonstration. I think we have to think about how this all fits together. There's three legs to this stool, and this is one of them.*

C: *I am thinking about how I can explain to the Korean government about why we need this, and what benefit Korea can draw. You're perfectly right. We should clarify what our common interests are. My guess is that our common interest should be in reducing market risk. How we can do that to make this business condition more favorable for SMRs should be the common interest. In the global market, we have climate talks, but nuclear is not always an accepted option. Once you accept nuclear as a carbon reduction option, you can get some benefits such as a negative carbon tax. Maybe this will help the business more favorable. Is there any chance we can negotiate this with these groups to categorize nuclear as a more favorable technology in the global dialogue of climate change? The other point is financing. You mentioned the international banks that don't support nuclear businesses. Why can insist to change this. Both the US and Japan are the biggest shareholders in the international banks. If you can persuade your government, then you can try to negotiate this. If we can create support from international banks, we already have strong EXIM banks, we can improve the business environment. First thing we have to do is how we can clarify the common interest to tackle these things.*

A: Let's lay out why we want to create this coalition of the willing and a set of principles that we all agree to.

A: Let's look at regulatory risk, and how it was solved in the UAE. It was a creative solution for a newcomer country. From personal experience, when that argument was tried in Turkey with the Turkish regulator, it was dead on arrival. If there had been a tool in the toolbox by a bunch of countries about how to engage in risk sharing opportunities in regulatory structures in newcomer countries, and that was produced by a robust group of companies, it would have gone further. Now, KAERI and KACARE can go into country X where they have never done nuclear before. Instead of squaring it back from the beginning where it would take 1-2 years before it was sorted out, what if you can go to this online resource center and take an off-the-shelf product that you can point to. That can be the starting point for a discussion that removes the speculation of private interests. You don't have to agree with 100% of it, but even if you agree with 80% of it, it helps you deploy a reactor. If you have those types of tools then countries who don't know what they're doing don't have to be convinced every step of the way that they're not being undercut by private interests.

A: When Korea introduced the first nuclear plant, it was dependent on the country of origin's regulatory regime. Korea did not have any human resources to review the technical aspects of this technology, so it depended totally on the US regulatory body. Saudi Arabia also made the decision to construct the SMART reactor, and they asked Korea the same thing. We have the regulatory framework, so they followed the Korean regulatory regime. During this design, Saudi Arabia not only depended on ours. In the future, they will have a huge nuclear program, so they dispatched to KINS 18 people so that they can be trained for almost 1.5 years on technical issues. I think the four countries have different regulatory regimes. Even though Korea depended on the US regulatory regime, and the regimes are almost the same, it took almost 4.5 years for the US to certify the AP1400. We cannot combine the regulatory regime.

A: You can come up with regulatory principles. There was risk sharing between KEPCO and the project company with the emirates government. There was a risk sharing based on a baseline set of assumed regulations. It wasn't that one side bore all the risk. That principle was very powerful. That kind of an idea can be applied to other countries. Regardless of how you regulate, how you manage that risk is something that needs to be addressed. That can be suggested to other countries. They will still have to make regulatory decisions. If we have already solved this problem, we can put it on a paper so that they can have something to go off of.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

C: *Apparently in the US, you will have some sort of AR or SMR demonstration by 2025 as the story goes. We have a number of folks talking about that same time range as well. What I'm hearing is that most of the countries aren't interested in a FOAK anyway. There might be some timing there as well as we go through there. If we're going to capture this information, learn from it, and then figure out what really applies, then what does that mean for things like EPZs. This can be added into this.*

A: If you can develop this multilateral regulatory standard for SMRs, that would be great, and every country would accept those standards.

A: One thing that's coming up in less than a year is the design certification for NuScale. If the NRC accepts this, this could be the design certification basis for other countries. This could be an opportunity to align the regulatory approach with regards to what really is the defining difference between large and small reactors. Getting four countries to agree to this kind of approach would be significant.

A: Some of those product features may make the NRA more likely to approve them.

A: If you have four relatively mature nuclear nations taking a common approach, that's a pretty good flag that people will get behind. The thing here is we're a year away from having that, and we're 5 years from having an SMR demonstrated.

A: It's a very short window, and it's immaterial to me whether it happens or not. If it doesn't happen, you'll look at the onramps that people drove past.

A: I will offer five ideas. One, that we put together a revised paper and circulate it. I would like to know who are the points of contact for each government represented here today. In the revision we set out what we consider to be the common principles and we revise the driver section so it doesn't look like we're lobbying on behalf of anything. We identify an 18 month assumed deliverable. Identify in that a date for decision by each country whether they are in or out, and what products they are most interested in financing. Finally, it would be useful to have some seed money to do what we just explained because we are all working for free, and there's a limit to which the free labor will expire. If that sounds okay, then it would be useful to know who the four points of contact are.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Session 9: Next Steps and Takeaways

ABSTRACT

While many see the democratic process as an obstacle to competing against state backed nuclear companies, it may prove to be an asset if the democratic nations can realize a competitive package. One area that the coalition shares an interest in is engagement innovation. Of the IAEA milestones, human resource is a particular area that the coalition can share resources to develop.

SPEAKERS

- Jessica Lovering, Director of Energy, Breakthrough Institute
- Alan Ahn, Director of Programs and Communications, Global America Business Institute (GABI)

SUMMARY

While many see the democratic process as an obstacle to competing against state backed nuclear companies, it may prove to be an asset if the democratic nations can realize a competitive package. One area that the coalition shares an interest in is engagement innovation.

- Every country faces similar problems when it comes to engaging with communities and politicians, so collaboration in this area can prove to benefit all.

Of the IAEA milestones, human resource is a particular area that the coalition can share resources to develop.

- Examples could include a rotating graduate program among the different countries.

QUESTION & ANSWER

Q: *When we say that there's no opportunity for collaboration, doesn't that happen holistically between countries? What are we going to do about that in this room? NuScale has signed agreements with part of the Canadian supply chain. I think there's opportunity. If we're waiting for those to finish and then collaborate on the next one, I would argue that it's too late.*

A: Doesn't collaboration happen at the company level?

C: *One of the insights I got over the last two days was the idea of take back and the priority on nonproliferation. In Canada, we have not branded our business models. All of our models for deploying SMRs for emerging markets in Canada are examples of build-own-operate-takeback. That's the business model of Russia. As we move forward in Canada, assuming we can succeed in this, we are developing insights on how companies and governments can come together to offer nonnuclear markets solutions that are trusted and can deal with the full spectrum of issues. It seems to me that this is a powerful insight to have. How can we replicate this in the developing world? I think collaboration around the business models that make this work with the opportunity for Canadian programs to be testing grounds would closely inform like minded nations so you're able to help us get those models right, but also be positioned to take these models into developing countries. We still have to deal with regulatory issues. We have a national policy on fuel, and we have a repository. I can't imagine that Korea would offer a take back service. We do have to collaborate on the demonstrations, but this is something that we can really work on to make sure we get it right.*

A: There have been international investigations into multilateral fuel takeback services. Australia has looked into this.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

A: When we were speaking in regard to Chalk River, NuScale, and SMART, we felt those were in a mature stage. Maybe there's room for cooperation on a non LWR SMR. There are obviously initiatives in various countries to develop test reactors. In the US, there are plans for the VTR.
A: That is already happening in the companies and the supply chain.

C: *The idea that there might be a multinational repository might be interesting. That and the integrated fast reactor concept to dispose of the plutonium are a good idea, but those are different objectives than creating clean power available. If we bundle all these together, it'll create a big mess that will be hard to succeed in. Those are all going to be difficult for different reasons. I see the bundling of these as a problem.*

Q: *What broader topics do you want to see in future meetings? Maybe waste could be one of them.*
A: I think that I agree with you that there are strengths to a decentralized government. If you can create an integrated package to compete, you can succeed very well. What we're talking about here seems to be about creating and enabling ways to do that by playing to the strengths of that model. I think we need to think big about the different possible models. I don't deny that's a useful set of criteria to think about, but I think we need to think about different models as well. If human resources is a limiting factor in newcomer countries, but maybe the model may not involve the need for their human resources. Maybe they don't want to develop the human resource capacity. So we need to think of models that may differ from what we're thinking about now. We talked about the graded milestones approach, and while that may be useful, I think we need to think beyond that. We're really just looking for information. That's not to say this precludes action. I think thinking about this and investigating the options is the right action.
A: You were saying newcomer countries don't know who to talk to. They don't know who to call. Some of the ideas yesterday were around that unlocking that aspect. How do we engage our potential customers? Who are these hypothetical customer countries? We saw on the roadmap that having early engagement was valuable in getting them to the table. Some were not interested, and others wanted to learn more. I think there's still a need for bringing these countries and customers in to talk about what's the best way to engage. In terms of communications and engagement more broadly on ARs and SMRs, I think there's some linkages here with the CEMI that's led by Canada, the US, and Japan. That's a space where discussions around milestones approaches aren't really applicable there, but you can discuss energy security and how to enable this. I know the US is very interested in developing countries, so I think there's an opportunity there.
A: It's going to be more than discussions.
A: There's a lot of need for upfront capacity building.

C: *I think whenever we talk about project models versus milestones, the milestones program is about a country's nuclear program. The milestones document is at a higher level than companies. The milestones hit at a certain level, but it doesn't give you a project. If you take the milestones as a checklist, you don't just check the boxes and then you look up and there's a working nuclear plant. The goal of this coalition of the willing is not just to help them put together a nuclear program, but also to help them get a project there. One issue is the long term life of what we're creating. There was some concern about whether this endures, but the point of it is, when you go back to the presentation yesterday, you're bringing in vendor countries. Once you show them the work you've done, you're bringing in clients to see what they want or need. This will impact the final product. Once you engage them in this process, the resource center could just be a Dropbox with a set of tools. We can engage with what the customers ultimately want. I think on this whole bit about collaboration and* reaching out to the

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

customers to hear more, we have built that into the process. There's another level to take with this as well. There's nothing that says we couldn't have an event at the IAEA general conference, or to do something at Vienna where the countries will be there. The US has the authority to do reverse trade missions, and there is funding for that. There's no reason we couldn't have a semiannual event that rotates across the four countries to use funding sources to bring countries in. Vendors can show up, and it could be a marketing act, but it would be a dialogue with all the countries that support this dialogue along with end users. ROSATOM does their expo every year. The French do theirs every 2 years. There's nothing that says that something around this couldn't be done. The only word of caution is that we have to get started. I think we have to be very clear. If we have too many things and too many ideas, it'll get lost. We need to think about what is the first act that we can do and get funding for. These discussion points can be all on a thought list that we eventually get to, but we can't overwhelm people with these all at once.

C: *I like the idea of tools we can develop together. Is there an interest in market assessments for which countries may be interested? We talked about the structure of this collaboration and then start looking at host countries, but do we need to look at the client countries before we develop models? In terms of tools for newcomer countries, I wanted to bring in something from outside of nuclear. For those working in renewables, there's a great software package called HOMER developed by a national lab. It's a planning tool optimizer, and it can be used anywhere in the world. It has resources to tell you your availability of natural resources as well as the cost of solar and wind. I wonder if we can develop this type of tool for the nuclear industry. This could help them develop their own country roadmap. This is a way to engage with newcomer countries*.

Q: *We've had a chance to speak with a few people from NWMO, and one of their main missions is to engage with host communities. Who within agencies or entities within Canada would have that expertise in terms of engaging with communities to help us learn how to engage with host communities? What other perspectives and broad communities do we need to have included in this discussion?*
A: I think NWMO is doing some very important work in Canada to engage on the waste issue. They're a non-profit industry funded organization. They would have good models for engagement in Canada. I think that's a good idea. Maybe there are good lessons to learn from countries who have bodies like NWMO. I know Finland has pursued a similar process. In terms of engagement with developing countries, I think there are some similarities with indigenous communities in Canada, but I am sure there are differences as well. I am not sure who the right people are, but I think understanding markets and knowing who's interested would help us know who to work with and how to engage.
A: You talked about the takeback model. Who's having those discussions with the remote communities?
A: This is not just about nuclear power. We want to do development with the North of Canada. We don't have an answer on this. We are in the process of formulating the questions.

C: *I think there's an elephant in this room. We come forward with the proposal. I'm not the Canadian government, but I can tell you that I'm very unfamiliar with the process of gaining government support when government is not in the room. I can tell you frankly, the likelihood of success here is virtually zero. Two weeks before the Canadian election, there won't be any agreement to fund this. What's Japan's view? What's Korea's view? We may be setting ourselves up for failure. I think there's a lot of merit to what was put up here, but my sense is that it could fail. The Canadians in this room were not prepared to come out of here with a deliverable ask to fund a project. What if this doesn't work? What if someone doesn't come back? Do we move forward?*

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

And then what? My concern is that we're going to walk away with this unrealistic idea, and then that would be a shame.

C: *SMR has a chance with opportunities, but there are also constraints. I recognized that I trapped myself into conventional thinking. We all know that large-scale projects fail in the market. The reason we are asking for SMR is because large scale plants fail in the market. So we should solve these issues in the market. We should be creative in regard to all the issues we discussed. I think we should solve our problems through the market or else we have no chance. Why not let Australia have a business chance to develop a multinational repository? If the SMR is tested in a developed country, it may not be the same constraints as in developing countries, but it would at least solve one of the constraints. Then we can tackle the other constraints. The engagement may be more necessary for developed nations, but a nation like Korea has a strong enough government that it can do something it puts its mind to. Maybe in developing countries they don't need as much engagement*.

A: I looked at three cases: Korean case, US case, and Canadian case. The Korean case supplier may be KAERI and other consortiums. The capacity is in design, supply chain, construction, and regulation. They are well prepared for all these in the case of KACARE. The important thing is that the government funds it. In the US case, there is NuScale, UAMPS, and INL. NuScale has the capability of design with no supply chain. They are in the process of getting design certification. I think NuScale needs to find supply chain, so they make an MOU with Doosan heavy industries. I don't know exactly if they have a clear contract to complete the construction. The recipients INL and UAMPS have a well established infrastructure. In the Canadian case, they are finding supply without funding. The recipients may include local governments, but the supplier capacity only has conceptual design in development. Canada also needs to develop an infrastructure. I don't know if the federal government will supply funding or not. I think that Canadian case will be more similar to the developing countries in my thoughts. I think it will be very difficult to form a multilateral coalition of the willing because all these cases have a very different approach and perspective. In that sense, we can make some multilateral forum because we have to develop a lot of options for developing countries and developed countries. The Korean case looks the most promising for the construction of SMRs compared to other cases. I think we can come together to have several options.

A: Once the debris at Fukushima is taken out, we have to clean it up, so we can sell the idea of the IFR and pyroprocessing plant at Fukushima as a testing ground.

A: The reason I'm here is not to join any specific coalition to promote SMRs or designs. My concern was that if we don't do anything, we may not reach the goal of climate change. We may also see Russian and Chinese dominance in the nuclear business. I think SMRs could be an opportunity. I tend to agree with the Canadians that this is an opportunity that SMRs can be deployed consistently with nonproliferation conditions. If you say a coalition of the willing to sell or deploy SMRs, then that is not my intention. If you say a coalition of the willing is a way for governments to commit to investigating how SMRs can contribute to climate goals, I think that's a good idea. Maybe we should come together to discuss how these new models such as build-own-operate-takeback can be implemented. I think Airbus is a good example of how industry and government can collaborate to promote a technology that satisfies competitiveness. My concern is that if you're trying to hurry on a specific action, that's ok. I'm not probably useful if that's the case. As a researcher talking is not useless. It's very useful. I think we have to continue this dialogue. Implementation is very important, but that's up to the practitioners. My goal is to contribute ideas and talk about the alternatives to make sure they satisfy nonproliferation objectives. If GABI wants to produce some sort of action-based coalition, then that's ok, but I cannot contribute. You can form a different coalition of individual companies to implement the deployment of

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

SMRs, but I did not know that this was the case of why we were coming together. I joined the GNI not to support to implementation of the project, but to contribute ideas on how the meet nonproliferation objectives.
A: I fully agree with that comment. I think the benefit of this kind of workshop comes far beyond other meetings I've had in DC. At least we list out all the problems. I don't think this workshop can solve all these issues. That's not the purpose of this workshop. This workshop is very important for maintaining the network. We had three days to talk and network among each other.
A: I think when we go back, it's important to remember what the whole point of this was. There is one problem we're trying to attack. It doesn't preclude what IAEA, IFNEC are doing. It's not to preempt any of those activities. A lot of what we're talking about go beyond what the point of this was. The point of this was that there were problems that we agree that we need to solve. We agreed that it's not being solved. I think with engaging with our governments, it's important to ask if there are any options out there that are solving our problems. If we agree that we need to solve the problem, then we need to solve the problem. Let's be brutally honest. NuScale doesn't have an order book contingent on their demonstration. KAERI does not have an order book for 50 SMART reactors around the world. The job of this activity is not to promote SMART. The job is to create a fertile ground to support the people to go out and do what they need to do. Promoting one country over the other is not the point. It's to create the playing field so that the people can be successful. I think we do need to be clear about that when we leave here. We don't have the right set of conditions to solve the problem right now. As good as SMART and NuScale might be, if there isn't an order book, then we still have the same problem. We're not addressing climate change and clean energy. Yes, it's great to talk about the other stuff, but let's never lose the point of why we're here.
A: This is a very important community in my point of view to share SMR development information.
A: My opinion is that we tried to find what kind of coalition structure for SMRs. If we discuss this point, we need to have a governmental view. We also need industry's view. Until we get that we cannot understand what needs to be done. If we find a real solution to the coalition structure, in this case, we need industrial and governmental views. In Japan, I can go to industry and government to discuss what kind of structure we need. To make a whole plan to have a structure for a solution is too early. We can only discuss the next step.
A: It seems to me that only Canada can contemplate a takeback option down the line. Let's say if we talk about an Airbus type of model, we can start talking about a product that can compete and have an order book.
A: In the spirit of providing options on the way forward, number one, let's continue with the path that we agreed to yesterday. Let's put the proposal forward and see what government says. But we need a fall back. The fall back would be that if the government does not agree to this proposal, we need to hear what they would want instead. This may at least provide an opportunity for us to know how to get where we need to go. I think these comments around the market are foundational. There are two things. Big reactors don't work, and in democracy, state run programs don't work. We have to change the paradigm in a bunch of ways. My nuance on this is let's not put this in a case of having one proposal, take it or leave it. Let's get feedback to see what else can work. This may require another round of discussions. With this feedback, we can see how the coalition can move forward. Or may be we can modify an existing government program to accomplish what we think is important.

C: *I feel a sense of urgency. When you look at the landscape, I don't see people focusing enough on delivering projects. I think we talk about creating technologies, which is nice, but they don't turn into projects. I think there needs to be a focus on developing countries. How do we making this easier without compromising the important principles? I worry that anything to try and come up with a modification of a current platform is going to take*

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

time for people to work on. It needs to be supported by governments and stakeholders, and to do that will take no small amount of time. I worry that I don't know when this is going to happen. I think generally understand the idea and like the idea at some levels, and I agree there is fine tuning needs to be done, but I think we first need people to say yes, and we need people to fund this. We can't expect people to be devoting their time. Having worked on a lot of IAEA projects, there's a big difference doing something part time and doing something dedicated. When you're making a paycheck every two weeks or a month, that's when a difference is made. My concern coming out of this is that everyone is going to go back and it's going to die. We are biased and concerned because there was an event previously where they brought together a lot of stakeholders and fabulous discussion. But nothing was really produced. It was great but it was unsatisfying because nothing came out of it. We tried to do something, and we had meetings in DC, but it died. The point is not to convene again in 6 months to talk again. Some of us have no interest in that. If the next thing is to just talk about the same thing, we've already failed. I think it's very telling that our Canadian friends said that anything outside of this room, please don't say anything with China and Russia on it. I get it and I respect that, but when they talk to their government they have to talk about anything that resonates with that result. The US government will not act on climate change, but they will act on geopolitics. I'm optimistic that there are people that want to carry this forward. There's a difference between the four countries to develop their own export regimes. This is something different. In order to achieve a difference in thinking, and to get developing countries to think about SMRs, it cannot be the views of one country. The point is to get countries to endorse the idea and support it while producing something. We should not let the perfect be the enemy of the good here. The thing is more whether we believe in the problems, whether we need to do something collectively. If we keep it at that level, then we'll get somewhere. If we leave it to government officials, we'll be in the same spot five years from now. You have to create a process or activity that's self sustaining. That's difficult for governments to do. We have to keep the message from here very simple and very clean. Whether countries want to work on pyroprocessing is not the point of this. It may tangentially be impacted by this, but that's not what this is about. Each country will have a slightly different idea. Just because a few of us started the idea doesn't give us ownership of the idea. The ownership will come from countries that endorse this. The idea is for the governments to decide that collectively, they need to create a new pathway for SMR deployment in the developing world. They will then fund a group of people under the government supervision who will be responsible for creating this new idea. You're empowering experts funded by the government and working under the government's direction to create these new ideas. The governments then bring in other client partners, then you can look at NGOs and industry organizations to endorse what's been created. The individuals that are hired are working for the people that are providing the money, which are the governments. The idea is not that experts are doing what they want to do, the idea is that governments are telling these experts what needs to happen. A bunch of experts coming up with ideas will be ignored. A bunch of governments signing something that was produced by experts through government review will succeed. The coalition of the willing phrasing is important. You have the IAEA that does so much good work. The problem is that you have countries in there that are anti-nuclear. IFNEC has countries in it that are anti-nuclear. You've created a process that has blocked itself from succeeding. The idea is whether you buy into the concept. If you buy into it, then you can come aboard, and if not, we have no use for you. If you don't like the idea, that's fine, but we're not going to have you here because it's not helpful.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Participant Bios

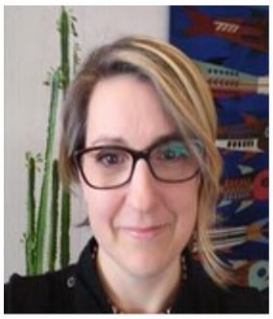
Mr. Alan Ahn is Director of Programs and Communications at the Global America Business Institute (GABI). Mr. Ahn is responsible for conceiving, researching, planning, organizing, directing, executing and moderating the institute's program activities on energy and technology policy issues, including but not limited to: developments in global nuclear power, clean and renewable energy technology R&D, climate change and carbon mitigation, U.S. nuclear export control policy, international civil nuclear cooperation, nuclear nonproliferation and security, and energy security in Northeast Asia. Mr. Ahn has written and presented on issues such as spent nuclear fuel management, energy policies of South Korea and Japan, nuclear plant decommissioning, international energy R&D cooperation, and so forth. Mr. Ahn received his B.S. in International Political Economy from Georgetown University and his MA in Law and Diplomacy from the Fletcher School at Tufts University.

Dr. Rita Baranwal is Assistant Secretary for Nuclear Energy at the U.S. Department of Energy (DOE), the first woman to lead the Office of Nuclear Energy. In her new role, Dr. Baranwal will lead the office's efforts to promote R&D on existing and advanced nuclear technologies, maintain the existing fleet of nuclear reactors, and promote the development of a robust pipeline of advanced reactor designs and supply chain capabilities. Previously, she has directed the Gateway for Accelerated Innovation in Nuclear (GAIN) initiative connects industry with national laboratories to help commercialize nuclear technologies. Under her leadership, GAIN positively impacted 112 project and companies. Previously, Baranwal worked for Westinghouse in the nuclear fuel division, leading a number of R&D programs. She started her career at Bettis Atomic Power Laboratory helping to develop advanced nuclear fuel materials for U.S. naval reactors. Dr. Baranwal received B.A. from MIT in materials science and engineering and Master's and Ph.D in the same discipline from the University of Michigan.

Ms. Carol L. Berrigan is Senior Director for Supplier Policy and Programs at the Nuclear Energy Institute (NEI). In this role, she is responsible for the organization's nuclear manufacturing infrastructure, international trade, nuclear technology exports, and supplier-related activities. Ms. Berrigan, who re-joined NEI in 2003, also manages the U.S. Women in Nuclear program. Ms. Berrigan was with USCEA, an NEI predecessor organization, from 1992-1994. Previously, Ms. Berrigan was Director of Marketing for Pulseworks, where she was responsible for managing marketing and business development functions. Ms. Berrigan was a Program Manager for Camber Corporation, a specialized engineering and management consulting firm in Washington, DC from 1994-1998. She supported several U.S. government programs related to climate change, renewable energy, energy efficiency and trade issues. Ms. Berrigan received a B.A .from the University of Chicago. She is a member of the boards of directors of the American Nuclear Society and WiN Global.

Dr. Stephen Bushby is Senior Director, Commercial Oversight and S&T Integration at Atomic Energy of Canada Limited (AECL). Since joining AECL 25 years ago, Dr. Bushby has held a number of technical and management positions, including: Director of Advanced Reactor Development program; Program Director of Canada's Generation-IV program; Director of the Reactor Safety Division; General Manager of AECL's $150 M/yr capital and improvement portfolio; General Manager of Strategic Planning, with a focus on restructuring of the Canadian Nuclear Laboratories; and Senior Director of Science and Technology. Dr. Bushby spent 2.5 years as Special Advisor to the Director General of Energy – the federal department responsible for nuclear energy in Canada. Dr. Bushby obtained his PhD in Chemistry/Surface Science from the University of Western Ontario in 1992.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM



Ms. Diane Cameron is Director of the Nuclear Energy Division at Natural Resources Canada (NRCan). As Director, she heads up the division responsible for leading and coordinating federal policy on nuclear energy. Ms. Cameron has ten years of experience in the Government of Canada, working on energy, environment, and trade policy—including NAFTA, US relations, and international negotiations. Prior to government, Ms. Cameron spent seven years in the private sector specializing in global value chains and network-level optimization, advising international transportation companies on logistics. She received a Masters in Technology and Policy from MIT, where she was named Alfred Keil Fellow for Wiser Uses of Science and Technology. She also holds a Bachelor of Applied Science in Systems Design Engineering from the University of Waterloo.

Dr. Soon-heung Chang is President of Handong Global University (HGU) and member of the Presidential Advisory Council on Science and Technology, Republic of Korea. Previously, he was Professor in the Department of Nuclear and Quantum Engineering at the Korea Advanced Institute of Science and Technology (KAIST), teaching courses in nuclear reactor safety, nuclear power plant design, and nuclear computation. He also served as Provost at KAIST, Commissioner for the Korea Nuclear Safety Commission, Member of the International Nuclear Safety Advisory Group, IAEA, and Member of the International Advisors for the Investigation Committee on the Accident at the Fukushima Nuclear Power Stations. He is a frequent plenary speaker, a lead consultant for many large initiatives and author of numerous journal articles. Professor Chang was also Chairman of the Board of Trustees of the Korea Institute of Nuclear Safety (KINS). He received his B.A. in Nuclear Engineering from Seoul National University and both his M.S. and Ph.D. in Nuclear Engineering from MIT.

Mr. Paul Dickman is a Senior Policy Fellow with Argonne National Laboratory focusing on international nuclear energy, non-proliferation, and national security policy. For over 35 years, Mr. Dickman has been involved in the forefront of nuclear energy and national security programs in the U.S. and internationally. He has held senior managerial positions at the U.S. Nuclear Regulatory Commission and the DOE's National Nuclear Security Administration. He holds leadership positions in the American Nuclear Society and the World Council on Isotopes, advises organizations on risk communication, and serves as an advisor to the Japanese Government on the decommission of the Fukushima accident site. He writes and frequently speaks on nuclear waste and fuel cycle issues, the promotion of U.S. civil nuclear technology and safety, and international nonproliferation. Mr. Dickman received his B.A. in History (of Science) from University of Denver and M.S. in Natural Sciences in Nuclear Chemistry and Physics from the University of Wyoming.

Mr. Edward Kee is Founder and Principal Consultant at Nuclear Economics Consulting Group (NECG) and also an Affiliated Expert at NERA Economic Consulting. Mr. Kee provides strategic and economic advice to companies and governments on nuclear power and electricity industry issues. He has testified as an expert witness in the U.S. and international legal and arbitration cases. Prior to starting NECG, Mr. Kee held senior consulting positions at NERA Economic Consulting, CRA International, PA Consulting Group, Putnam, Hayes & Bartlett, and McKinsey & Company. He was a merchant power plant developer and a nuclear power plant engineer (qualified as chief engineering officer on Nimitz-class nuclear aircraft carriers) before becoming a consultant. Mr. Kee has authored numerous articles on nuclear power and the electricity industry. Mr. Kee holds an MBA from Harvard University and a B.S in Systems Engineering from the U.S. Naval Academy.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

GLOBAL AMERICA BUSINESS INSTITUTE

Dr. Keung-Koo Kim started his career in the Korea Atomic Energy Research Institute (KAERI) in 1981. He has worked for 33 years in the various nuclear R&D projects. Since 1997, He has developed SMART reactor which is an advanced integral small reactor. Currently he is a Vice President for SMART Development in the Korea Atomic Energy Research Institute. His specialties are small modular reactor development, system dynamic analysis and advanced control system design. He received 'Science and Technology Medal' from Korean Government in 2016. He received a bachelor's degree and Master's in Nuclear Engineering from Seoul National University and Ph.D in Nuclear Engineering from MIT.

Dr. Yuki Kobayashi is Research Fellow at the International Peace and Security Department within the Sasakawa Peace Foundation (SPF). In France, Dr. Kobayashi researched issues related to the Fukushima accident, including conducting field research in Japan, interviewing Japanese political and industrial leaders, and organizing seminars on nuclear safety. At Ecole des Mines Paris, Dr. Kobayashi wrote his doctoral dissertation on the relationship between technical and political leaders during the response to/management of Fukushima. Dr. Kobayashi's areas of expertise include global and regional energy security, Japanese economic and energy policy, and international nuclear safety practices and norms.

Dr. Kwang-Seok Lee is Senior Policy Advisor for Internal Relations at KAERI, which he joined in 1991. He has led many studies in the areas of national nuclear technology development policies and foreign policies. Some areas in which he has led studies are the national nuclear energy promotion plan, the international nuclear non-proliferation regime, relations with nuclear international organizations, and bilateral and regional nuclear cooperation. He was heavily involved in the ROK-USA 123 agreement negotiation. Dr. Lee worked for OECD/NEA as a consultant, leading international projects as a technical secretariat in such areas as nuclear innovation, advanced nuclear fuel cycle options, and non-electricity nuclear products. He received his B.S. and M.S. in industrial engineering from Seoul National University and his Ph.D. in industrial and systems engineering from the Virginia Polytechnic Institute.

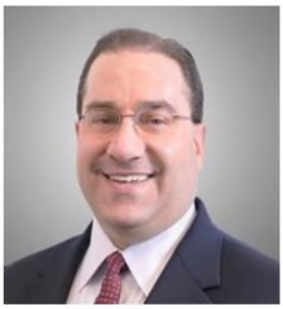
Dr. Chae-Young Lim is Vice President of Strategic Planning at Korea Atomic Energy Research Institute (KAERI). Previously he was in charge of Nuclear Policy Division and Research Project Management Division of KAERI. Since he joined the KAERI in 1998, he was mainly working on the studies for drafting national nuclear promotion policy and electricity expansion plan. He is a member of National Energy Committee which consults the Minister of Trade, Industry and Energy about major energy policy issues. He received his B.S. in Nuclear Engineering from Seoul National University and earned Master's and Ph.D. in Nuclear Engineering from Korea Advanced Institute of Science and Technology (KAIST)

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Ms. Jessica Lovering is the director of Breakthough's Energy program. Her research has focused on how innovation in nuclear energy can bring down costs and accelerate deployment to help mitigate climate change. Ms. Lovering was the lead author on the peer-reviewed paper, Historical construction costs of global nuclear power reactors, which was the top-rated paper in Energy Policy for over a year. She co-authored the report Atoms for Africa: Is There a Future for Civil Nuclear Energy in Sub-Saharan Africa? with several Breakthrough Generation Fellows. She worked with experts from R Street Institute and ClearPath to publish a set of policy recommendations around micronuclear in Planting the Seeds of a Distributed Nuclear Revolution. Ms. Lovering holds a B.A. in Astrophysics from the University of California, Berkeley, as well as an M.S. in Astrophysics and Planetary Science and an M.S. in Environmental Policy, both from the University of Colorado. She is pursuing Ph.D. in Engineering and Public Policy from Carnegie Mellon University.

Ms. Florence Lowe-Lee is President and Founder of the Global America Business Institute (GABI). Since its founding, one of the primary organizational missions has been to act as a forum and platform for discussion on policy-relevant energy and technology issues, with a focus on technologies that enable and facilitate an environmentally sustainable and low-carbon energy future. Previously, Ms. Lowe-Lee served as Treasurer, Director of Finance and Publications at the Korea Economic Institute of America (KEIA) where she focused on issues impacting Korea's macroeconomic development as well as security concern on Korean peninsula. She worked as Director of Operations at the Massachusetts Senate Ways and Means Committee and served as an advisor to the Massachusetts Office of Trade and Investment. Ms. Lowe-Lee received B.A. in Neuroscience from Mount Holyoke College and M.A. in Industrial/Organizational Psychology from Columbia University.

Mr. Kenneth N. Luongo is the president and founder of the Partnership for Global Security (PGS) and the Center for a Secure Nuclear Future. He has authored nearly 100 articles, been a TEDx presenter, engaged extensively with global media, and briefed governments and audiences around the world on nuclear and transnational security challenges and responses. He has created and led a number of cross-cutting international coalitions and private sector-policy expert partnerships that fuse diverse expertise to develop actionable, realistic responses to rapidly evolving security challenges. Mr. Luongo served as the Senior Advisor to the Secretary of Energy for Nonproliferation Policy, DOE's Director of the Office of Arms Control and Nonproliferation, Director of the DOE's Russia and Newly Independent States Nuclear Material Security Task Force and Director of the North Korea Task Force. Mr. Luongo received B.A. in journalism from Boston University and M.A. in International Affairs from the American University School of International Service.



Mr. Paul Murphy is President of Murphy Energy & Infrastructure Consulting LLC. Previously, he was a managing director in Gowling WLG's Energy Group. Mr. Murphy's practice focuses on multiple aspects of the nuclear industry–from legal and policy matters to strategies for developing and financing nuclear power programs and the identification and mitigation of associated risks–representing developers/owners, lenders, investors, and contractors on nuclear projects internationally. He is recognized as an expert in the development and financing of nuclear power programs by the International Atomic Energy Agency (IAEA), the OECD's Nuclear Energy Agency (NEA), International Framework for Nuclear Energy Cooperation (IFNEC), and the U.S. government. Mr. Murphy currently serves on the IAEA's Technical Cooperation Program team, which assists member states in developing civilian nuclear power programs. He received A.B. from Princeton University's Woodrow Wilson School for Public Policy and International Affairs and J.D. from Harvard Law School.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Dr. Yasushi Okano is Deputy Director of Nuclear Energy Policy Planning Division, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry of Japan (METI). He currently manages fast reactor development programs, and also actively deals with international corporations on advanced reactors. He began his professional career as an assistant professor at Tokyo University, after which he joined the Japan Atomic Energy Agency (JAEA) to work on sodium-cooled fast reactor R&D. He was a visiting engineering at the Massachusetts Institute of Technology during 2001-2002, and an international technical secretary at OECD/NEA in France from 2005-2009. He graduated from Tokyo University with his BS in 1992 and his PhD in 1997, both in nuclear engineering. His research background includes thermal hydraulics, reactor core design, external hazard PSA, and safety requirement harmonization for advanced reactors.

Mr. Hugh Robertson is Director General of the Directorate of Regulatory Improvement and Major Projects Management (DRIMPM) at the Canadian Nuclear Safety Commission (CNSC). In this position, he leads a dynamic team that supports the CNSC's mission and mandate by managing the licensing of new nuclear reactors, supporting the Regulatory Safety Culture program, implementing and maintaining the CNSC's Management System, managing the operations planning and performance process, as well as coordinating cross cutting corporate improvement initiatives under the Harmonized Plan. Prior to joining the Canadian Nuclear Safety Commission in 2005, Mr. Robertson worked at the Department of National Defence in various Information Technology management positions. In 2014-2015 Mr. Robertson accepted an assignment with the Chief Information Officer for the Government of New Zealand, as Manager of Information and Communication Technology (ICT) Operations Assurance. In this role he was responsible for implementing and monitoring an ICT assurance program across all major government departments.

Mr. Jae Soo Ryu is Head of Global Strategy Research Team at KAERI. At KAERI, Mr. Ryu has served as Project Manager for studies on issues such as strengthening international cooperation among IAEA member states, enhancing US-ROK nuclear cooperation, responding to North Korea's nuclear tests, and reinforcing international nuclear cooperation under the International Framework for Nuclear Energy Cooperation (IFNEC). Mr. Ryu has also been a part of the Korean delegations to the 2015 NPT Review conference Preparatory Committee Meeting and the 2012 Nuclear Security Summit Sous-Sherpa Meeting. Mr. Ryu received both his B.S. and M.S. in Nuclear Engineering from Hanyang University.

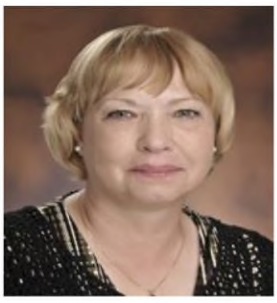
Mr. Yutaka Sagayama is Assistant to the President at the Japan Atomic Energy Agency (JAEA), Senior Advisor to Japan's Ministry of Education, Culture, Sports, Science, and Technology (MEXT), Senior Advisor for the Japan Power Company (JAPC), and Chair Emeritus of the Generation IV International Forum (GIF) Policy Group. Prior to his current position at JAEA, he served as both Director General and Deputy Director General at the Advanced Nuclear System Research and Development Directorate at the JAEA. He has also held positions such as Executive Director of JAPC, Director of the FBR Cycle Development Office within the Executive Office for Policy Planning and Administration, Head Office at the Japan Nuclear Cycle Development Institute (JNC), and Manager of the Reactor System Evaluation Group at the FBR Cycle Development Office within the Executive Office for Policy Planning and Administration at JNC. Mr. Sagayama graduated from Keio University in Japan with a degree in Mechanical Engineering.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM

Dr. Tatsujiro Suzuki is a Director and Professor at the Research Center for Nuclear Weapons Abolition (RECNA) at Nagasaki University, Japan. Before joining RECNA, he was a Vice Chairman of Japan Atomic Energy Commission (JAEC) of the Cabinet office from January 2010 to April 2014. Until then, he was an Associate Vice President of the Central Research Institute of Electric Power Industry in Japan (1996-2009) and Visiting Professor at the Graduate School of Public Policy, University of Tokyo (2005-009), an Associate Director of MIT International Program on Enhanced Nuclear Power Safety from 1988-1993 and a Research Associate at MIT Center for International Studies (1993-95) where he co-authored a report on Japan's plutonium program. He is also a Council Member of Pugwash Conferences on Science and World Affairs (2007-09 and from 2014). Dr. Suzuki has a PhD in nuclear engineering from Tokyo University (1988).

Mr. Nobuo Tanaka is President of the Sasakawa Peace Foundation (SPF). He served as Executive Director of the International Energy Agency (IEA) from 2007 to 2011. As IEA Executive Director, Mr. Tanaka was responsible for pioneering the concept of "comprehensive energy security," while also expanding the Agency's focus on climate change, renewable energy and the transition to a low-carbon energy economy. Mr. Tanaka led the IEA's work on fossil fuel subsidy reform, energy efficiency policy recommendations (adopted by the G8), low-carbon energy technology roadmaps, gas and electricity security, energy poverty, and carbon capture and storage. Mr. Tanaka began his career in 1973 in the Ministry of Economy, Trade and Industry (METI) in Tokyo and also served as both Deputy Director and Director for Science, Technology and Industry (DSTI) for the Paris-based OECD. In 2011, Mr. Tanaka was Global Associate for Energy Security and Sustainability at the Institute of Energy Economics, Japan (IEEJ). Mr. Tanaka has a degree in Economics from the University of Tokyo and an MBA from Case Western Reserve University in Cleveland, Ohio.

Dr. Robert Walker was previously President and CEO of Canadian Nuclear Laboratories (CNL) from 2014 to 2015 and President and CEO of Atomic Energy of Canada Limited (AECL) from 2011 to 2015. Previously, he had a distinguished career as scientist, manager and executive with the research and development arm of the Department of National Defense. From 2005 until 2010, he served as Assistant Deputy Minister of Science and Technology at the Canadian Department of National Defence and CEO of Defence Research and Development Canada. Dr. Walker also served as the Chair of the NATO Research and Technology Board as well as the Chair of the Board for the Network of Centers of Excellence in Marine Environmental Observation. Dr. Walker earned B.S in Physics form Acadia University, MEng in Engineering Physics and a Ph.D. in Electrical Engineering from McMaster University. Dr. Walker is a recipient of the Canadian Forces Medallion for Distinguished Service and the Canadian Nuclear Association's 2015 Ian McRae Award of Merit.



Dr. Phyllis Yoshida is the Senior Fellow for Energy and Technology at the Sasakawa Peace Foundation USA (SPFUSA). Prior to joining SPFUSA, she served as Deputy Assistant Secretary for Asia, Europe, and the Americas at the U.S. Department of Energy (DOE), coordinating bilateral relationships and serving as the Lead Shepherd of APEC's Energy Working Group. She also served as DOE's Director of the FreedomCAR and Fuel Partnership, a government-industry cooperative research partnership. She also has held policy and research positions over her career at the U.S. House of Representatives, the Japan Economic Institute, George Mason University, and the U.S. Department of Commerce. She received her B.A. from Carleton College, and M.A. and Ph.D. from the George Washington University. She was the first recipient of Japan's GARIOA/Fulbright Fellowship, under which she studied in 1983-1984 at the University of Tokyo and conducted research on Japan's automobile industry.

Received by NSD/FARA Registration Unit 12/27/2019 2:33:18 AM